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THE GAS JOURNAL

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A Glance at the Contents—

Institution of Gas Engineers.

A written communication, by Mr. William Green, on Dr. Lessing's Paper before the Institution last June is published. [p. 326.]

The Unprofitable Consumer.

The question of tariffs in relation to the unprofitable consumer is discussed by A. Nübling, of the Tariffs Committee of the German Union of Gas and Water Engineers. [p. 318.]

Leicester's Guide to Airmen.

We publish to-day an aerial photograph of No. 4 gasholder at the Aylestone Road Works of the City of Leicester Gas Department, showing the word "Leicester" which has been painted on the crown, in letters 30 ft. deep by 6 ft. wide. [p. 320.]

Value of Tar to Small Gas-Works.

We give an extract of a paper by Mr. T. Dix before the Gas Institute of New Zealand, in which he describes a "small plant which is giving every satisfaction in the preparation of tar for roads." He sells his dehydrated tar at 9d. a gallon. [p. 321.]

Hot Water and Gas Tariffs.

Mr. H. C. Ridley, of Christchurch (N.Z.), gives the following reasons, among others, why gas undertakings should change their methods of charging for gas. A much greater consumption per meter will be obtained; the load will be spread over the 24 hours; overhead charges will be spread over at least double the consumption; capital expenditure per million c.ft. of gas sold will be less. [p. 324.]

Gas Mantle Vending Machine.

We describe the type of gas mantle vending machine manufactured by Messrs. J. Collis & Sons, Ltd., of London. Fifty of these machines have recently been supplied to a Gas Company who, we understand, are extremely pleased with the results, as extensive sales of mantles have been made. Frequently their night watchmen have to refill the machines within two hours; also, they have not taken a single counterfeit coin. [p. 319.]

Oxide Purification.

An extract from a paper on this subject, by Mr. C. Singleton, of Melbourne, before the Gas Institute of New Zealand, is published. [p. 326.]

Street Lighting by Gas.

Photographs are reproduced showing the excellent results of the high-pressure gas lighting of Coventry's new central thoroughfare, Corporation Street. [p. 318.]

New Showrooms at Cliftonville.

We publish an illustrated description of the new showrooms which the Isle of Thanet Gas Company have recently opened in the main shopping centre of Cliftonville. [p. 314.]

Lubrication of Modern Gas Plant.

Mr. J. H. Pennington, of Dunedin, gives many useful hints on the lubrication of gas-works plant, including locomotives and steam cranes, crushers, elevators, screens, conveyors, retorts, coke handling plant, and general gas machinery. [p. 322.]

Gas Meters.

"Judging by the condition of the meters, in for repair, that have come under my notice during the last five years in the Dominion, the straight-out chrome certainly appears to stand up better to the type of gas made generally in this country. I have found, however, that straight-out chrome, in common with other leathers, becomes detanned when brought into contact with metallic iron."—From a paper by Mr. C. E. Hibberd, of Wellington, before the Gas Institute of New Zealand. [p. 321.]

New Showrooms Opened at Southall.

We publish to-day a description of the second of the two Gas Light and Coke Company showrooms opened recently. The first was opened at Harrow on July 21, and described in last week's "JOURNAL," and the present premises at Southall on the following day. Councillor J. A. Saxon, J.P. (Chairman of the Southall-Norwood Urban District Council), opened the showrooms with a silver key, and subsequently spoke at tea, kindly provided by the Gas Light and Coke Company, at which Sir David Milne-Watson presided. [p. 313.]

EDITORIAL NOTES

Anticipation and Realization

EVERY reader of the "JOURNAL" will have taken the earliest opportunity of studying the full report which appeared in the last issue of the address delivered by Sir David Milne-Watson when presiding at the annual luncheon of the Central Executive Board of the National Gas Council. The subject was the report of the Committee on Main Line Railway Electrification—a subject of supreme importance in view of the staggering amount of money that is involved, and the highly problematical nature of the advantages reasonably to be anticipated from the change-over from steam. The matter was dealt with dispassionately by Sir David, by means of closely-reasoned argument, which presented a strong case in support of his demand that the scheme should be most carefully investigated. The points on the side of advantage from main line electrification being nebulous, and promising (even if realized to the full) but a small return, it becomes imperative that estimates of cost should be accurate beyond any question, and in this connection the President of the National Gas Council, as he was fairly entitled to do, outlined certain discrepancies between anticipation and realization as relating to the electricity grid scheme.

Having published Sir David's statement, it is due to the Electricity Board to reproduce their reply, though it seems to go but a short way in traversing the original argument. While the Board declare that, so far as the national grid is concerned, expenditure is working out well within the Weir Report estimates for the work contemplated by the Weir Committee, the fact remains that in their report for 1930 the Board point out that the original estimate "for the construction of the grid, for standardization of frequency, and for other purposes, including the provision of working capital," was £33,500,000. In a reply to the Board's comments, Sir David deals with this and other matters, as will be seen on a later page. After explaining that the estimate with regard to the standardization of frequency has now had to be increased to £16,300,000 (from the original estimate of £8,500,000), the report adds that "the Board are therefore faced with an estimated expenditure, including the cost of raising loans, of approximately £50,000,000." Does it not seem reasonable to deduce from this that, even allowing for an additional £8,000,000 for standardization of frequency, a further £9,000,000 is required for the construction of the grid itself over and above that originally estimated?

It is said by the Board in their reply that the estimates had to be increased owing to the rapid development in the use of electrical apparatus. This would appear to indicate an increase in the units consumed beyond that which was estimated for in the original Weir Report; but such an indication would be hardly in accordance with the facts. Again, whether or not the increase in the cost of standardization affects the finances of the grid is immaterial to Sir David's argument that promise and performance in regard to the earlier scheme point to the need for closest scrutiny of the estimates of the Railway Electrification Committee.

What Figures Show

THESE are times when judgment is apt to be critical with regard to expenditure, and there were some people who questioned the necessity of taking a census of the country, as was done earlier this year. A few even went so far as to refuse to fill up the forms (with the result that the individual, as well as the communal, purse suffered), though whether this refusal had for its basis bashfulness or principle, it is impossible to tell. Like costing in industry, the census is essential, if we are properly to regulate the business of the country, though some of the facts which emerge from the questionnaire submitted by the authorities are visible also to the naked eye.

Some comfort was derivable by the Gas Industry, as carrying on a public utility service, from the preliminary report issued a short time ago, showing the population of England and Wales as a whole, and of an extensive series of local areas. These figures are subject to confirmation, though we have the assurance of the Registrar-General that "no material discrepancy is to be expected, judging by past experience." As set forth, they hold out promise of continued growth of business for the Gas Industry, for the population of the country is still increasing. As compared with ten years ago, when the last preceding census was taken, the population of England and Wales has gone up by 2,061,232, to just under 40,000,000. A division of the figures between the sexes is of interest, in that it reveals a female majority of 1,670,243. But if the total figures are significant, their relation to area is even more so. Not only is the population the largest yet recorded in this country, but "the areal density it represents—685 persons per square mile—is, with a possible exception in the case of Belgium, far higher than that of any country of which there is record—much more than double those of a large majority of other countries." Discussion of our unemployment problem, and arguments having a bearing upon imports, must be incomplete if this fact is not borne constantly in mind, even though it be pointed out that, "but for the exceptional loss of men during the war, the present decennial rate of increase (5·52 p.ct.) would have been the lowest recorded in respect of England and Wales since census taking was introduced in 1801."

There is no space here, neither is there any inclination, to discuss the vexed question of the birth rate. With such an areal density as has been referred to above, one side of the case speaks for itself. There are, however, other, and possibly more impressive, aspects of the situation revealed by the Registrar-General in the remark that "the comparative lowness of the latest population increase is wholly due to the enormous reduction in the number of births during the past ten years." Coming to details, the total births registered in the 1921-31 intercensal period are more than 1,250,000 fewer than in the period which covered the war years, when the birth rate was lower than ever before in this country. On the other hand, the deaths registered during the ten years in question show that we have reached a lower mortality rate. Of interest to the Gas Industry in another way is the statement that the census reveals the southward trend of population. The counties north of Cheshire and Yorkshire inclusive have on balance lost 443,000 of their populations by migration during the past decennium, and from the central belt Wales has lost 259,000, the Midlands 81,000, and the Eastern region 41,000. On the other hand, both the Southern regions (South-Western and South-Eastern) have gained by migration, the bulk being registered, as might be expected, in the South-Eastern section, where the net immigrants number 615,000.

In the County of London and the immediately sur-

rounding areas designated the " Outer Ring " (which together comprise what is usually known as Greater London, and coincide with the area covered by the City of London and Metropolitan Police Districts) 8,202,818 persons were enumerated, representing rather more than one-quarter of the urban population, and about one-fifth of the total population of England and Wales. Within the County of London alone a small decrease is recorded. Of the towns outside the County of London, Birmingham heads the list with a population which has now passed the million mark; by its considerable increase of 8·7 p.ct., it has advanced its lead over Liverpool and Manchester, which continue to rank second and third on the list, with populations in excess of three-quarters of a million. Sheffield, with its half-million population, has remained practically stationary during the decennium.

Illumination Congress

" METEOR'S " Editorial Notes in the " Electrical Times " for July 30 contain the following piquant observations on the part which gas is to play in the programme of the International Illumination Congress:

> The great International Illumination Congress opens auspiciously on Tuesday, Sept. 1, in the showrooms of the Gas Light and Coke Company. There will be night inspections of the very fine high-pressure gas lighting of Whitehall, Regent Street, Piccadilly, Fleet Street, and other leading streets, also of electric lighting in some of them. Prominent amongst the papers to be read we find one by the eminent Hon. Treasurer, Sir Francis Goodenough, on street lighting by gas; another by the Public Lighting Department of the South Metropolitan Gas Company on the same subject; and yet another by the Society of British Gas Industries on the gas lighting of factories and large buildings. There will be a visit to Elma's showrooms, but it is to be preceded by a visit to the showrooms of the Gas Light and Coke Company, who have some important points to discuss. There will be a visit to Deptford Electric Power Station, but it will be preceded by one to Beckton Gas-Works. Many will be tired out by Beckton. There will be a visit to the electric lighting on the Embankment, but the gas lighting of Whitehall is put first in the list. When we first realized the prominent rôle in the proceedings that Sir Francis Goodenough was taking, we quite anticipated that gas would have its say. He has only done his duty; we offer him no criticism, he is rather to be admired. But we were not quite prepared for this presentation of the case with gas so conspicuously in the forefront. The programme will be a surprise for our visitors from America where gas is no longer recognized as an illuminating agent and even the gas showrooms are lighted electrically. We make further reference to the programme on a later page.

We imagine that the surprise in store for our American as well as the Continental visitors to the Congress will be the splendid show which the Gas Industry, without the aid of political millions, is putting up over here in the lighting field. The Congress delegates will see no finer specimens of street lighting than will be on view in Whitehall and other parts of London.

Sir Francis Goodenough (who is Hon. Treasurer of the Congress and Chairman of the Congress Publicity Committee) has rightly taken his part in seeing that gas has its proper place in the Congress programme, but he would be the first to disclaim credit for the enterprise of others; and what is being done by the Gas Industry to demonstrate the important part gas plays in illumination in this country is the work of many to whom the thanks of all are due.

Industry and Power Plant

THAT it should not be beyond the capabilities of the governing authorities to find some means of at least alleviating the existing distressful condition of industrial affairs by diverting the energies and resources at present going to waste into reconstructive channels, is the opinion of Mr. James B. M'Gillivray, and it is an opinion with which we find ourselves in accord. World depression of an acute character does exist, of course; but it provides small consolation, and does no other good whatever, to strive to show that other countries are no better off than we are. However they may stand, we ourselves are face to face with a position which we simply cannot afford to allow to remain. It is unhelpful to ask what is being done about it; the position speaks for itself. But the taxpayers, who are meeting ruinous demands upon their pockets, have a right to demand that every possible avenue shall be explored in searching for a road to greater prosperity; and Mr. M'Gillivray suggests such an avenue.

His scheme for creating efficiency in industry and reducing unemployment is grounded upon the argument that if the prime movers which are responsible for the motive power are modern and efficient, manufacturing operations are upon the best producing basis. This is a point which the Gas Industry must have always in mind, if the industrial load is to grow as it should do. Mr. M'Gillivray has, however, more in view the production of steam in solid-fuel fired boiler plants; and he explains how it is that he believes Great Britain has fallen behind in this matter. The immense cost of fuel during the war in countries which had to import coal supplies caused a tremendous concentration of scientific skill upon the best means for utilizing to the utmost the heat energy required in industrial undertakings, and this concentration caused the introduction in these countries of many improvements in plant, and the lowering of factory costs. In Great Britain, on the other hand, during that period coal was cheap and all the factories were working hard on munitions, having no time to consider improvements of any kind. At the end of the war the demand for all classes of goods was so great that every energy was exerted in executing orders, and no time was available for improving the factory plants. Then came the inevitable slump, and changed trading conditions found Great Britain faced with keen competition from all quarters.

Towards More Employment?

FALLING off of business had its natural effect upon balance-sheets, with the result that financial facilities were obtainable by those who did not require them, and were denied to those having most need of them. The best that can be said is that the unemployment problem has undergone some alleviation by the carrying out of unproductive works, which are obviously less desirable than expenditure upon plant to produce goods for export. What does Mr. M'Gillivray propose in connection with the use of coal for steam-raising purposes? An increase in the efficiency of existing plants; and the installation of up-to-date power plant of higher pressure, the use of recent inventions for the reduction of fuel consumption, and the proper utilization of the steam produced by storing in accumulators until required. It is doubtless correct to say that many other items of equipment also could with good results be installed, were facilities at hand to enable this to be done. Much has, of course, already been accomplished, but the circumstances have been such that it has been difficult to get any scheme adopted on a sufficiently extensive scale.

To place Great Britain in a position to produce in the most economical and efficient manner, so as to allow this country to compete successfully in the markets abroad, Mr. M'Gillivray suggests the appointment of a Central Board comprising representatives of the Government, employers, trade unions, and banking, insurance, and accounting interests. The proposals put before the Board for approval would provide for the supply of plant for payment over a period of (say) three to five years. No supply would be entertained which did not provide for an initial payment by the purchaser of a fixed proportion of the contract price. It is suggested that the unpaid balance should be guaranteed in the following proportions: The Government, 62·5 p.ct.; an insurance company, 25 p.ct.; and the manufacturer, 12·5 p.ct. Rates would be charged to cover interest and any loss, and a small percentage of the contract price would be payable to a fund dispensed by the Central Board for the payment of salaries of the Executive, consisting of technical and commercial experts and staff. Here is a practical suggestion, at a time when people are surfeited with theories.

PERSONAL

Mr. F. SCHOLEFIELD, Secretary and Manager to the Drighlington and Gildersome Gas Company, retires at the end of August after 18½ years in that post, and will reside at Morecambe. Previous to taking up that appointment he was 30 years with the Dewsbury Corporation Gas Department, these being the only two appointments he has held. While at Drighlington he has served a term on the Urban District Council. Mr. MORRIS DRIVER, Gas-Works Manager to the Silsden Urban District Council, has been appointed to succeed Mr. Scholefield at the Drighlington and Gildersome Undertaking. Mr. Driver has been in the service of the Silsden Undertaking 22 years, having risen from apprentice to Manager, which office he took over in 1919. He begins duty at Drighlington on Sept. 1.

At a recent meeting of the Newton-in-Makerfield Urban District Council the question came before them of the retirement of Mr. RICHARD T. SURTEES at the end of November next, and it was decided to offer him an honorarium of £100 to act in a consultant capacity until the end of the present financial year. Mr. Surtees holds the offices of Engineer and Manager in the Gas, Electricity, and Water Departments of the Council, and, in addition to the ordinary routine duties connected therewith, has been responsible for the building of a new gas-works, the provision of an electrical scheme for the district, and the putting-down of new wells and pumping plant for a new water supply—an experience which seldom falls to the lot of the gas engineer.

OBITUARY

JAMES SMITH.

The death has occurred of Mr. James Smith, Gas and Electrical Engineer and Manager to the Colwyn Bay Urban Council, in his 61st year, after a few days' illness. He is mourned by his wife, son, and daughter, with whom deep sympathy is felt.

A native of Padiham, Lancashire, Mr. Smith took up engineering as a career, and in course of time became Gas Manager at Congleton, Cheshire, where his ability and sterling qualities of character gained for him great popularity and esteem. His reputation as a successful administrator spread far and wide, and in 1910 the Colwyn Bay Council unanimously appointed him to be their Gas Manager, a selection upon which in later years they had reason to congratulate themselves. The position of Electrical Engineer became vacant during the latter part of the war period, and Mr. Smith was requested to undertake the dual position. This he did, and both Departments became the gainers in consequence. Under his direction the two undertakings have made excellent progress.

Heartfelt tributes to the late Mr. Smith were paid at a meeting of Colwyn Bay Council, on Thursday, July 30, when the speakers included the Chairman, Councillor John Holman, J.P., who for nine years was a member of the Lighting Committee and for two years its Chairman; Councillor George Bevan, J.P., the "Father" of the Council, who proposed Mr. Smith's appointment thirty-one years ago; and Councillor Oswald Jones, the present Chairman of the Lighting Committee. It was stated that during Mr. Smith's tenure of the position of Gas Manager the following developments had taken place. The capital outlay had increased from £95,000 to £220,000, the loan debt from £85,000 to £120,000, the income from £15,000 to £46,000, the volume of gas sold from 67 million to 193 million c.ft., and the number of consumers from 2511 to 5867.

When, in 1918, Mr. Smith was requested to take over the additional duties of Electrical Engineer, the capital outlay was £42,000, which had been increased to £162,498. Other increases were: Loan debt, £21,000 to £77,000; income, from £7000 to £33,263; units sold, from 314,000 to 2,260,000; number of consumers, from 888 to nearly 4000.

The funeral, on Friday last, was largely attended. There were present gas and electricity managers from Manchester and other Lancashire centres, Shropshire, Cheshire, and practically every North Wales town, as well as of the North Wales Power Company, technical organizations connected with both the gas and electricity industries, and a number of firms. Masonic Brethren attending included officers of Grand Lodge.

CORRESPONDENCE

Murdoch Letters

SIR,—As I am collecting material for a biography of William Murdoch, or Murdock, the inventor (1754-1839), I should be grateful to any of your readers who might assist me. I am especially anxious to see any of his personal correspondence that may have survived, and I should regard it as a great favour if any who are in possession of such correspondence would allow me to peruse and copy it.

R. BARCLAY MURDOCH.

874, *Aikenhead Road,*
Glasgow, S. 2,
July 29,1931.

[Our correspondent is the author of the article on William Murdoch which was published in the "JOURNAL" for May 15, 1929.—ED. "G.J."]

Water Heating Tariffs

SIR,—I am very much obliged to Mr. Ranft for the figures that he has put forward in connection with his undertaking. It is clear from the figures given that I cut too much into the available surplus for what I considered the necessary charges for the manufacture and distribution demand. His calculation accordingly produces a very much larger surplus than my own; and whereas my figures merely justified the rates charged, Mr. Ranft's show that they yield a very handsome return.

Mr. Ranft further points out that, as a matter of policy, he would not restrict the special terms to consumers already paying the full customer charge; and in view of his balance of £1 5s. 9d. remaining as a contribution towards the customer charge, there is no doubt he is on safe ground.

I should like to thank Mr. Ranft for clearing up the question of cost of the apparatus as well as for drawing attention to the clerical error in my equivalent price.

"ENGINEER."

FORTHCOMING ENGAGEMENTS

Aug. 11.—IRISH ASSOCIATION OF GAS MANAGERS.—Annual Meeting at the Guild Hall, Londonderry. President—Mr. G. Walmsley.

Sept. 10.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual Meeting in Rothesay.

Sept. 16.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of General Committee at 28, Grosvenor Gardens, S.W. 1.

Sept. 17.—SOCIETY OF BRITISH GAS INDUSTRIES.—Council meeting in the afternoon.

Sept. 17.—WALES AND MONMOUTHSHIRE ASSOCIATION.—Meeting at Porthcawl.

Sept. 28-30.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual Conference at Exeter.

Oct. 9.—NORTH OF ENGLAND ASSOCIATION.

Oct. 27-28.—INSTITUTION OF GAS ENGINEERS.—Autumnal Research Meeting.

THE NEWS OF THE WEEK

Robinson Bindley Processes, Ltd., has been registered as a Private Company to acquire interests in any processes relating to the distillation of bitumen, coal, peat, and other minerals. Nominal capital, £5000 in 1s. shares.

The Directors of the South Suburban Gas Company have declared dividends at the rate of 5 p.ct. on the perpetual preference stock of the Company, and of 6½ p.ct. per annum on the 5 p.ct. ordinary stock, for the half-year ended June 30, 1931.

The Smethwick Gas Committee have decided to inaugurate a scheme for a service offering to domestic consumers the free re-conditioning of burners and gas fires. The scheme will necessitate the employment of six additional workmen at a cost of £1240 per annum.

Arthur Duckham & Co., of Allington House, Victoria Street, S.W. 1, appears among the new companies registered. The nominal capital is stated to be £100, while the firm is to carry on business as engineers, heating specialists, and manufacturers of retorts, furnaces, and ovens.

A Ten Years' Contract for Street Lighting has just been effected by the Crowle Gas Undertaking of Messrs. Power, Light, and Heat, Ltd., with the Crowle Urban District Council. In addition, the same firm's Tuxford Undertaking has again secured the street lighting of that town in face of electrical competition.

Messrs. Falk, Stadelmann, & Co., Ltd., show a profit for the year to March 31 of £93,645. A sum of £10,595 is deducted from taxation; the dividend on the preference shares absorbs £31,500, and a dividend at the rate of 7½ p.ct. (same) on the ordinary shares £41,250. The amount carried forward is £25,095, against £25,085 last year.

For the Guidance of Air Pilots the Halifax Corporation Highways Committee have passed a resolution recommending the Gas Committee to have the name "Halifax" painted in big letters on the top of a gasholder. The chief gasholder at Halifax is quite near the railway, and is, therefore, regarded as a particularly suitable medium for use in this way.

Tottenham and District Gas Company.—Dividends in respect of the half-year ended June 30, 1931, have been declared at the following rates—viz.: 5 p.ct. preference stock, 5 p.ct. per annum; 5½ p.ct. preference stock, 5½ p.ct. per annum; ordinary stock, 6¾ p.ct. per annum, all less income-tax. The dividend on the ordinary stock is an increase at the rate of 2s. 6d. p.ct. per annum.

Metropolitan Gas Company of Melbourne.—Messrs. John Terry & Co., Agents for the Metropolitan Gas Company, Melbourne, Australia, have received a telegram informing them that the net profits for the six months to June 30, 1931, were £126,757; a dividend of 6s. 6d. per share has been declared; an amount of £34,702 has been transferred to reserve account; and a sum of £51,015 has been carried forward.

The Plymouth Gas Committee have decided to increase the charges as follows: From 2s. 6d. per 1000 c.ft., plus meter rent, to 3s., including meter rent; the rental of gas stoves on simple hire by 100 p.ct.; these charges to take effect from the Michaelmas readings. Consumers using prepayment meters at 30 c.ft. for 1d., and also renting hire stoves, will receive 25 c.ft. for 1d., including the rent of the stove, as from April 1.

A Swansea Builder, who is erecting a number of houses on the Cockett Farm Estate, has not only arranged for a gas service to be installed in each house he builds, but has made provision for one house, called "The Model House," to be completely equipped with a gas cooker, gas boiler for clothes washing, gas fires for heating, geyser for bath water, and a gas poker for lighting up the coal fire in the living room, in order that prospective tenants may see exactly how these modern labour-saving appliances appear in their correct setting. The supply and fixing of these appliances was carried out by the Swansea Gas Light Company.

Electricity Grid Estimates.

Central Board's Statement.

The following reply to statements made by Sir David Milne-Watson when discussing the scheme for the electrification of railway main lines ("JOURNAL," July 29, pp. 259-261) has been issued by the Central Electricity Board:

"So far as the national grid is concerned, expenditure is working out well within the Weir Report estimates for the work contemplated by the Weir Committee.

"So far as standardization of frequency is concerned, the Weir Committee's estimates were based on an investigation made in the year 1924. As stated in the third annual report of the Board, when the schemes under the Act came actually to be prepared by the Electricity Commissioners, the estimates had of necessity to be increased owing to the rapid development in the use of electrical apparatus which had taken place during the intervening years.

"While the cost of standardization is met out of money borrowed by the Central Electricity Board, the interest and sinking fund charges upon it are defrayed by means of a levy made on the electricity supply industry by the Electricity Commissioners under the Electricity (Supply) Act, 1926, and the increase in the cost of standardization does not therefore prejudice or affect the finances of the National Grid."

Lord Weir and the Committee's Report.

Last Friday's issue of "The Times" contained the following letter by Lord Weir:

"On Monday last my two good friends, Sir David Milne-Watson and Sir Arthur Duckham, made it clear to the country that any proposal to electrify the main railways of Great Britain will meet with the determined opposition of the Gas Industry.

"It is not my duty to traverse the arguments of my gas friends on electrical or transport problems, but I think it useful to point out that my colleagues and myself who were responsible for the Railway Electrification Report nowhere expressed any opinion as to whether the railways of this country should or should not be electrified. We were not asked to do so. The report says:

> "The decision involves national, financial, and possibly ultimate political considerations and implications which we do not feel it is any part of our present duty to discuss, but we trust that towards the consideration of the problem which will no doubt take place in the minds of those concerned, the railways, the Government, and the country, we have at least made clear the essential economic factors."

Sir David Milne-Watson's Rejoinder to the Central Electricity Board.

Sir David Milne-Watson replied, on Saturday, through the columns of the "Financial Times," in the following terms to the comments of the Central Electricity Board:

"With regard to the estimates for the National Grid, it is only necessary to look at the annual report of the Central Electricity Board for last year—namely, that ended Dec. 31, 1930—where it is pointed out that the original estimate 'for the construction of the grid, for standardization of frequency and for other purposes, including the provision of working capital,' was £33,500,000.

"The report then explains how this estimate has been exceeded, and goes on to state as follows: 'The Board are therefore faced with an estimated expenditure, including the cost of raising loans, of approximately £50,000,000, and by the Central Electricity Board (Increase of Borrowing Powers) Special Order, 1930, their borrowing powers have been increased to that sum.'

"With regard to the increased cost in the standardization of frequency, I only referred to this to show with what care any estimates of expenditure must be scrutinized. Whatever the reason may be, the fact remains that, instead of £8,500,000 being, as originally estimated, sufficient

THE NEWS—*continued.*

to cover this particular item, a figure of £16,300,000 will be required.

"If the estimates of expenditure for main line railway electrification are exceeded in the same proportion as £50,000,000 to £33,500,000, then the cost will not be £340,000,000, but will be in excess of £500,000,000."

Sheffield's Eight-Year Lighting Record.

"The large increase of motor traffic renders public lighting a subject of vital importance at the present time," says Mr. R. H. Minshall, Chairman of the Lighting Committee of the Sheffield City Council, in a foreword to the first annual report of his Department, "and all civic authorities are now realizing the necessity of scientific and expert treatment of the problem of road and street lighting."

The report shows in a series of graphs that the number of lights in Sheffield have increased since 1924 from 11,329 to 19,575, and the candle power from 500,000 in 1924 to 2,297,211 in 1931. During the same period the cost per candle has fallen from 2s. in 1924 to 6½d. in 1931. The report shows that, of the lamps in use on March 31, 1931, 15,708 were gas lamps and 3867 electric. The increase since 1924 has been 4666 gas and 3580 electric.

"The hardihood of the modern gas mantle," says the City Lighting Engineer, "is worthy of notice." During the year we used 101,481 mantles. The average effective life of the incandescent gas mantle in the street lighting of Sheffield for the year is 1385 burning hours.

Scarborough Corporation's High-Handed Action.

Criticism of Gas Ban on Housing Estate.

The Scarborough Corporation Housing Committee is taking up a determined stand—despite strong criticisms from other quarters—in favour of the 124 houses being, or to be, erected on the Northstead Estate, being all-electric. The Town Council approved this attitude, and have intimated to the Scarborough Gas Company that it has no desire for any gas services in the houses, and therefore no need for gas mains on the estate.

The Corporation's attitude is strongly criticized in the local Press, who declare that the tenant has a right to his choice of heating agencies, and if not allowed to have gas will eventually install coal fires or oil stoves in the search for a cheaper fuel than electricity. The local Press describes as "morally low" the Corporation's determination to bolster up a non-paying service, such as the electricity service of the town, at the expense of other undertakings.

"Why should any councillor, as a member of a municipal body, endeavour to act as a browbeating landlord upon a helpless ratepayer anxious to secure a home of his own?" asks a local paper. "There is no moral defence for such an action. There should be freedom of action and an end for all time to the attempt to create a state of affairs which can neither be defended nor made permanent."

Road Spraying Experiments.

The Highways Committee of the Middlesex County Council report having received an application from the South Metropolitan Gas Company for permission to undertake a series of road experiments in the county in connection with the surface spraying of roads with tar and tar compounds. The Gas Company's Technical Department require a length of about one mile of road, and desire to come to an arrangement whereby the cost of the work would not exceed the County Council's normal annual expenditure of spraying the length in question.

The Company are willing to supply the tar compounds and binding material, but would welcome the opportunity of having available the services of one of the Council's skilled road gangs for carrying out the work. The Company state that it is their policy to attempt to confirm their laboratory experimental work by carrying out large scale tests under normal outdoor conditions with regard to traffic and climatic influences.

The Committee are of opinion that no objection should be raised to the proposals of the Company subject to the Company indemnifying the Council against any claims received by reason of the work.

Revision of Gas Charges in Halifax.

Important revision in gas charges in the Halifax district was agreed to by the Gas Committee of the Corporation on July 20, and if approved at the meeting of the Town Council will come into operation on Oct. 1.

The following are the principal revisions suggested: Prices beyond the Borough (which have been 3s. 9d. per 1000 c.ft.) will in future be 3s. 6d., and inside the Borough the prices will be from 3s. 9d. down to 1s. 8d., according to the quantity used; in cases where gas has been used in excess of last year's consumption, the excess gas will only be charged at 1s. 6d. per 1000 c.ft.; the two tariff charges of 2s. down to 1s. 2d., *plus* a fixed quarterly charge, remain as before.

Water heating and central heating charges remain at the present rate of ¼d. per unit, but discounts (which have been at the rate of 10 and 20 p.ct.) will be at the rate of 20 to 40 p.ct.

The chief feature of these charges is that the main out-of-the-Borough charges become similar to those in the Borough. The areas mainly affected are Hipperholme, Lightcliffe, Bailiff Bridge, Norwood Green and Coley, and Southowram. These outside places buy approximately 60 million c.ft. of gas from Halifax.

Gas Company Secure Ilminster Public Lighting.

At a recent meeting of the Ilminster U.D.C. Lighting Committee tenders were received from the Ilminster Gas Light, Coal, and Coke Company, and from the South Somerset and District Electricity Company, for street lighting during the ensuing five years. After consideration, it was resolved (*a*) that the Companies be asked to submit tenders for a period of ten years; (*b*) that the Surveyor be asked to arrange with the Electricity Company for a demonstration of the lighting effects of two electric lamps to be fixed for the purpose at Bay Hill, and to invite members of the Committee to attend; (*c*) that if tenders were received in time, a further meeting of the Committee be held before the next meeting of the Council to consider them and report to the Council.

The Chairman said the demonstration had been given and further tenders received, and that the Committee had met previous to the Council meeting.

Mr. V. W. Dolman (Assistant Clerk) read the report of the Committee, which recommended that the terms of the Gas Company be accepted. This was for supplying gas at the current rate per 1000 c.ft., year by year, with a discount of 15 p.ct. This would mean a saving of £27 a year.

The Council unanimously agreed to the Committee's recommendation.

The Surveyor was authorized to purchase a number of lamp standards from the Axminster Council at 5s. each.

Bristol Gas Company's Pensioners.

The annual tea given by the Bristol Gas Company to the firm's pensioners was given in the Board Room at the Chief Offices, Colston Street, when about 64 were present.

Sir George Davies, the Chairman of the Company, presided, and those also present included Lady Davies, Alderman J. Fuller Eberle (Deputy-Chairman), Messrs. F. C. Burgess, Frank N. Cowlin (Directors), S. E. Halliwell (Secretary and Commercial Manager), and R. Robertson (Engineer and Works Manager).

Eight long service certificates were presented, and with the 82 who have already received them the total is now 90.

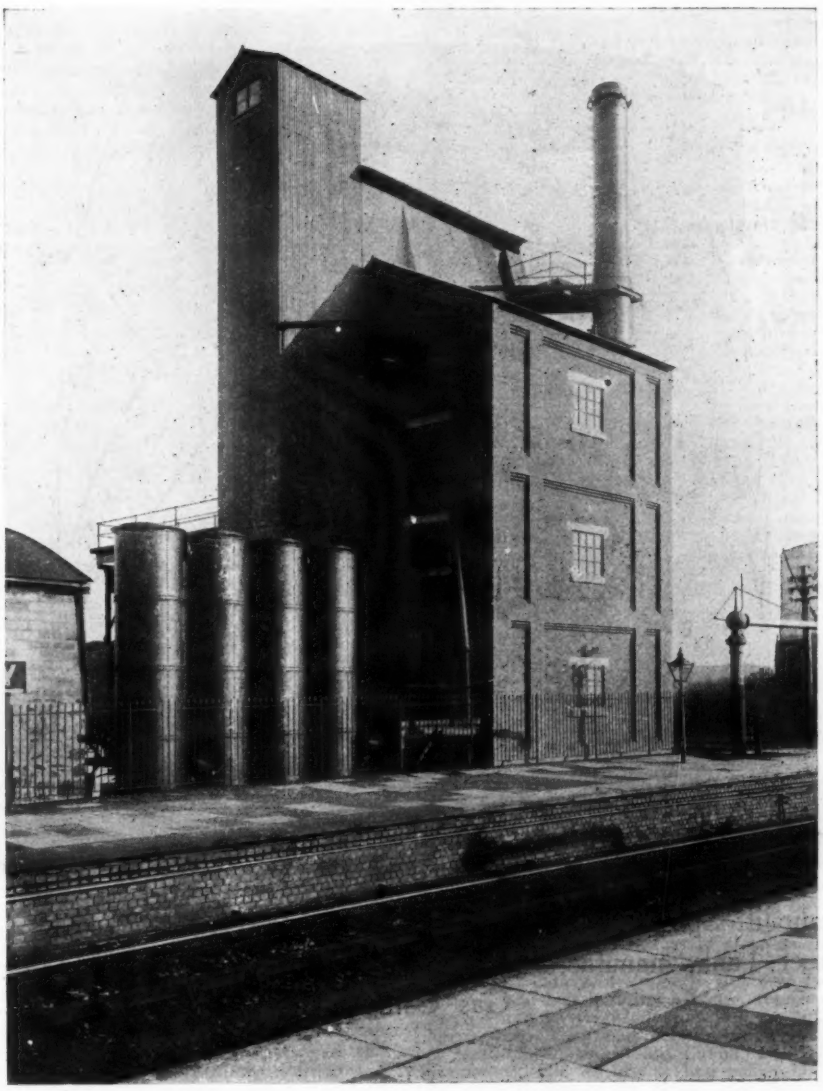
Yesterday's certificates were presented to: William Clark (Stapleton Road), 45; William Thomas Burns (Canon's Marsh), 40; John Gullick (Colston Street), 24; Thomas H. Powell (Canon's Marsh), 51; Albert Gunter (Avon Street), 35; James Rex (Canon's Marsh), 40; James Morrison (Canon's Marsh), 47; and James Ash (Canon's Marsh), 42.

After tea Sir George Davies, on behalf of the Directors, said he hoped the reunion would continue for many years to come, and referred to the loyal and satisfactory work of the pensioners present. It was always a pleasure, he said, to know and feel that they had worked so long and so well for the Company and that they were now living in their old age with some sort of provision. As their working life had been good so he hoped their retirement would be completely free from care.

Lady Davies then presented the certificates, and Mr. Fred Townsend, on behalf of the pensioners, thanked the Directors for their kindness and proposed a vote of thanks to Lady Davies. He said it was a real pleasure to meet old acquaintances, and he hoped the Gas Company would long prosper.

W-D

WOODALL-DUCKHAM CONTINUOUS VERTICAL RETORTS



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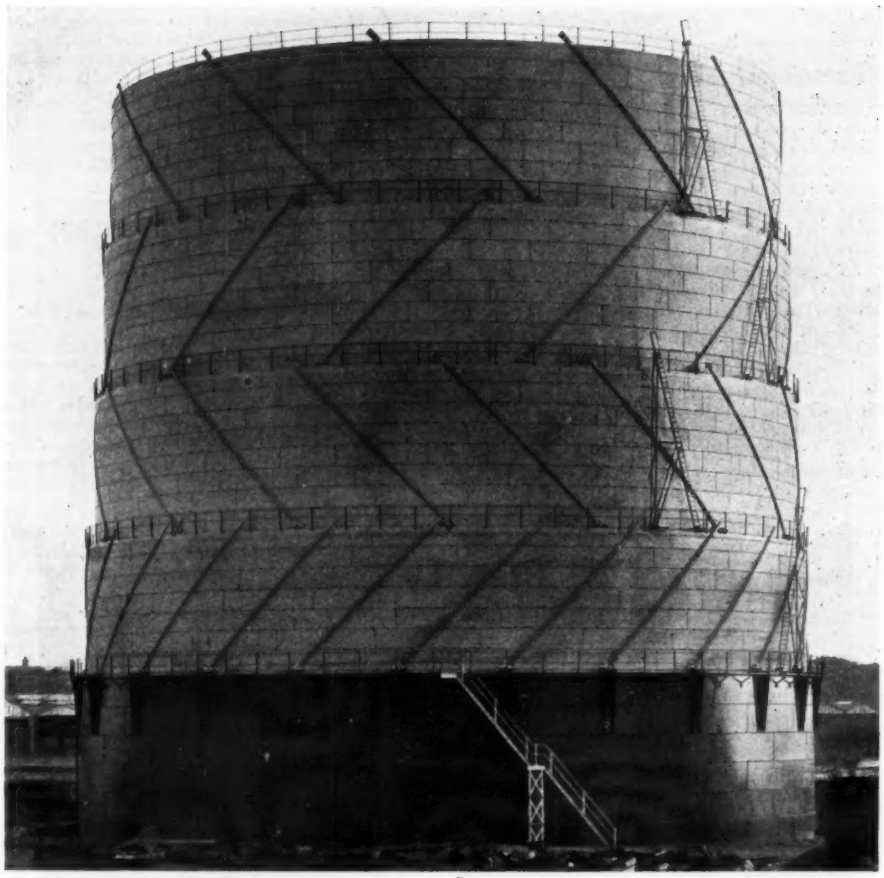

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Another Gas Light and Coke - - Company Enterprise - -

A description of the second of the two Gas Light and Coke Company Showrooms opened recently. The first was opened at Harrow on July 21, and described in last week's "JOURNAL," and the present premises at Southall on the following day

Until the present time there has been no showroom in existence at Southall belonging to the Gas Light and Coke Company, the nearest being at Brentford and Ealing. As a result of the large growth of the neighbourhood in recent years, however, the Directors decided that a showroom was essential if the 9000 consumers residing in this rapidly developing area were to receive adequate service. From being a purely residential district, in which gas was used almost entirely for domestic purposes, Southall is now also rapidly growing into a town of industrial importance by a process of orderly development along the main line of the Great Western Railway. Among the many firms in or near Southall with large annual gas consumptions are the Associated Equipment Company, Ltd., who build London's 'buses, the Crown Cork Company, Ltd., and Houlder's Chemical Works; Tickler's Jams and Scott's Emulsion are other well-known products of the district, in connection with which gas is of great importance.

The new showrooms at 9, Palace Parade, Southall, though of small dimensions compared with many of the premises recently opened by the Gas Light and Coke Company, give, nevertheless, an impression of greater size, and are completely equipped with examples of all kinds of domestic gas using appliances, many connected up for demonstration purposes, the gas fires being displayed in attractive and suitable surrounds.

The street window is of the "open" type, giving a clear view of the interior of the showroom, while at the far end is a counter for the payment of accounts, &c., so that a customer has to traverse the length of the showroom, with the result that in so doing a particular appliance may be noticed and thus lead to a sale.

The interior is sectionalized in accordance with the traditions of the Company, the most attractive lines in art-finish fires first meeting the eye from the street door. Further back are various gas cookers, while other sections are devoted to laundry and bathroom appliances. A wide range of attractive gas lighting fittings are on view, most of them being connected up and switch controlled for demonstration purposes.

The Opening Ceremony.

Promptly at 4 p.m. Councillor J. A. Saxon, J.P. (Chairman of the Southall-Norwood Urban District Council), accompanied by Mrs. Saxon and supported by Councillors and principal Officers of the Local Councils, were welcomed at the entrance to the new showrooms by the Governor of the Company, Sir David Milne-Watson, LL.D., D.L., with whom was Mr. R. W. Foot, the General Manager. There were also present, the Secretary (Mr. W. L. Galbraith), the Controller of Gas Sales (Mr. Stephen Lacey), and Mr. A. Digby, the Inspector-in-Charge of the district served by these showrooms, together with other Senior Officers of the Gas Sales Department.

Sir David Milne-Watson handed a silver key to Councillor Saxon, who, after opening the door of the new showrooms said: "It gives me great pleasure to declare these premises open, and I wish them every success."

The company then adjourned to the Holy Trinity Parish Hall nearby, where they were entertained at tea at the invitation of the Gas Light and Coke Company—Sir David Milne-Watson presiding.

After tea, Sir DAVID said that it was a great pleasure to see so many there that afternoon on the occasion of the opening of their new showrooms at Southall. First of all, he wished to thank Councillor and Mrs. Saxon for coming there to perform the opening ceremony. This was the 21st new showroom the Company had opened during the last few years; so it was an important occasion in the history of the Company. As they knew, the Gas Light and Coke Company had long supplied gas to Southall, and incidentally they had very large gas-works there. They had always wanted to have showrooms there, and he knew that the residents also had been very anxious to have showrooms where they could see gas-using appliances. At last they had their wish, and these showrooms had been very gracefully opened that afternoon by Councillor and Mrs. Saxon.

An Ancient Industry.

The Gas Light and Coke Company, went on Sir David, were very anxious to show how gas should be used in the best possible way. This was a very old industry, as they knew. The Gas Light and Coke Company, of which they formed part, was no less than 110 years old, and they looked forward to the future with as much confidence as they looked back with pride upon the past. They knew that they had carried on a great deal of good work in helping to purify the atmosphere of London. If they had not entirely dispelled fogs they had rendered them less objectionable. There was now a certain amount of mist in the Thames Valley, but by means of gas they had undoubtedly improved the atmosphere of this great city; and they all helped to perform this when they installed gas apparatus.

In the new showrooms they would find gas used as it should be used and in an artistic way. They used to be accused that gas fittings were ugly; but the fitting to-day was a thing of beauty, and even in the most beautiful house a gas fire could be installed without detracting from the beauty of the room in which it is put. This was a great achievement; and now that the Company had brought these showrooms to the town, instead of having to go to Ealing or Acton, they expected consumers to take advantage of them. If they at any time wanted larger showrooms they had only to use more gas, and then the Company would build still more beautiful premises in the future.

He would just like to say that in their Company they were not only trying to serve the public in regard to the supply of gas, but were also trying to make the lives of their employees as happy as possible. They were the pioneers in this country of doing all they could for the happiness of their employees. There were between 15,000 and 16,000 co-partners in the Company, holding upwards of £850,000 of the Company's ordinary stock. They would all agree with him that this was one of the finest things any employer could do for those who worked for him. They had also pension funds, benefit societies, sick funds, together with splendid sports grounds and sports associations. They had 100 acres of sports grounds in their district, where, after hours, the men and women could meet and have friendly games, and thus improve their health. This was a thing they were proud of.

He did not want to detain them any longer, said Sir David, in conclusion, but only to say how pleased he was to see so many there and how kind it was of Councillor and Mrs. Saxon to come and perform the opening ceremony.

Council's Visit to Gas-Works.

Councillor SAXON said that it was a great pleasure to be there on that occasion. The Council were very pleased, he said, to have had the opportunity of visiting the Southall Gas-Works some short while ago. They had a very interesting time there, and saw the wonderful machinery they had put in to decrease the cost of gas and increase the output. By installing all this wonderful machinery, however, employment was being reduced; that was the unfortunate part, but they had to face it.

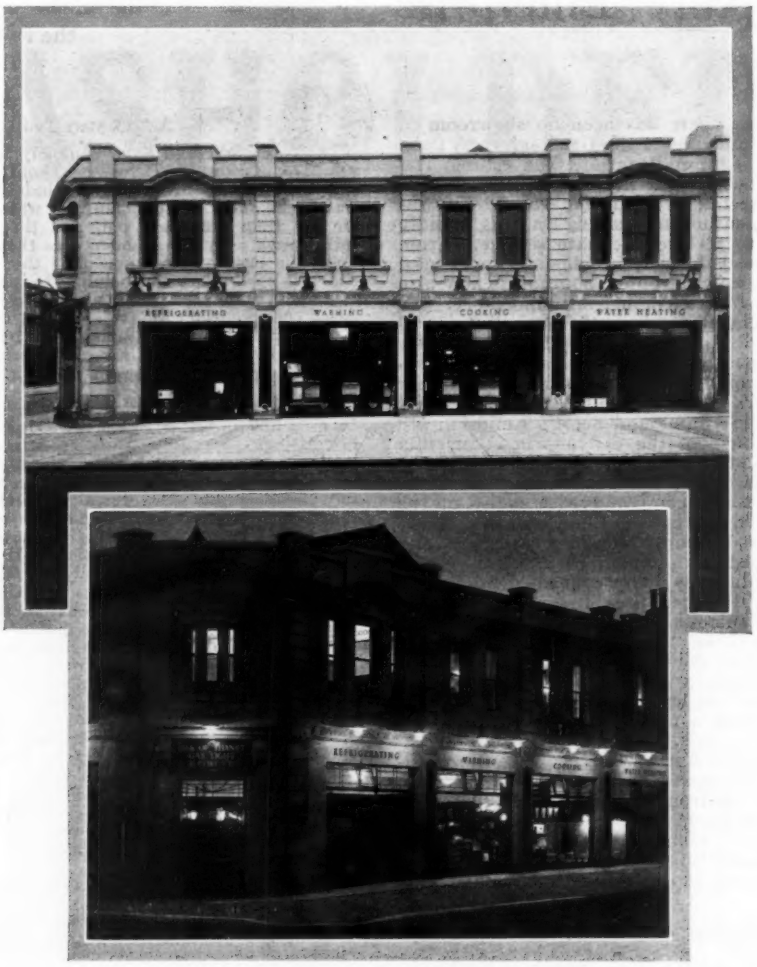
It had been a great pleasure to him to come and open these beautiful showrooms, and he was sure they could congratulate the Governor and Directors of the Gas Light and Coke Company upon such an attractive place. There were all kinds of artistic appliances, designed to suit both furnishing and pocket, while if one was building a house, representatives of the Company would advise what apparatus to put in and what would harmonize. They had been anxious to get these showrooms in Southall, continued Mr. Saxon, especially their Chamber of Commerce, and at last it had come. Before, people had to go over to Ealing or Acton, and they generally took their purses with them, and made purchases there. Now they would stay in Southall. It had been long delayed, but had come at last, and he hoped it would be a great success.

Sir DAVID MILNE-WATSON thanked Councillor Saxon for the kind things he had said. Sir David invited them to inspect the showrooms, and said that for those interested in industrial applications of gas there were industrial showrooms available, of which their representatives would tell them, and he hoped they would take an opportunity of paying them a visit.

Mr. Walter J. Tapper, A.R.A., Past President of the Institute of British Architects, was the Architect responsible for the design, decoration, and furnishing of the showrooms.

Distinctive New Showrooms . . at Cliftonville . .

A description of the new showrooms which the Isle of Thanet Gas Company have recently opened in the main shopping centre of Cliftonville



DAY AND A NIGHT VIEWS OF THE EXTERIOR OF THE NEW ISLE OF THANET GAS COMPANY SHOWROOMS AT CLIFTONVILLE.

The new showrooms recently opened by the Isle of Thanet Gas Company at Cliftonville are distinctive in appearance and occupy a commanding site in the main shopping centre where they will undoubtedly attract many customers.

The entrance door is surmounted with a solid bronze ornamental panel, bearing the name of the Company in letters inlaid in cream enamel. The lettering over each window is also in bronze, with dark blue enamel filling, and shows up most effectively against the white stonework of the building.

There is only one window on the short side of the building and arrangements have been made with local furnishing firms to take this window for three months at a time. Each firm which occupies the window for this period will give fortnightly displays of dining rooms, drawing rooms, bedrooms, and so on, and thus enable suitable gas appliances to be shown in their proper surroundings. A window on the other frontage will be employed for exhibits of particular apparatus or special advertising displays.

There are two floors, which are both employed to exhibit to the best possible advantage the various appliances in which gas can be utilized, many of which are "live" and capable of being demonstrated. The ground floor is handsomely equipped with counter, showcase, fire-stand, &c., and the walls are panelled to 8 ft. 6 in. in dark oak. A private room is provided where consumers can consult with the Showroom Superintendent apart from other consumers who may be at the counter.

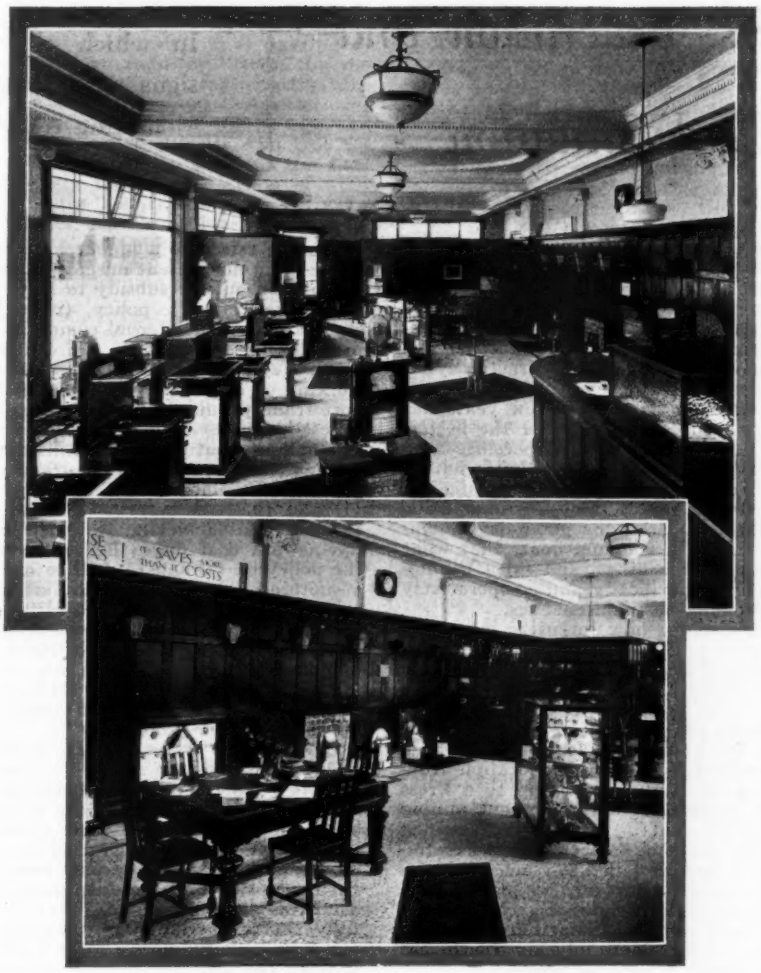
The internal lighting is effected by five ceiling lights of Sugg's "Kingsway" lamps fitted with six burners and operated by Newbridge switches.

The Upper Floor.

The upper floor is rather larger than the ground floor showroom and contains, in addition to showroom space, an office for the Superintendent and a small stock room. This floor is constructed in concrete, and match-boarded partitions, projecting 8 ft. from the side walls on each side, have been erected, thus providing display spaces. Here are to be seen various types of gas appliances, including those suitable for boarding house purposes. A section is devoted to a comprehensive display of water heating appliances, all working, including a "Sunhot," "Equator," "Newlyn," and "White Tile" heater, each delivering by a separate supply pipe into a pedestal lavatory basin.

The remaining portion of this floor is fitted with a platform for the purpose of giving cookery lectures and demonstrations, on which there is an "Electrolux" refrigerator, a cooker with glazed hood, together with an "Easiwork" cabinet and table.

As can be seen from an accompanying illustration, the night lighting of the exterior of the showroom is very effective. Each window is provided with two six-light lamps suspended on bronze brackets. All the lamps are automatically lighted and extinguished at predetermined times by a distance controller.



THE ABOVE PHOTOGRAPHS GIVE A GOOD IDEA OF THE ATTRACTIVE INTERIOR OF THE ISLE OF THANET GAS COMPANY'S NEW SHOWROOMS AT CLIFTONVILLE, DESCRIBED ON THE OPPOSITE PAGE.

REVIEWS

THE BARNSLEY COAL SEAM.*

The latest Survey Paper of the Fuel Research Division concerns the Barnsley seam of the South Yorkshire area of the Yorkshire, Nottinghamshire, and Derbyshire Coalfield, and is the eighteenth of the series. In it are given the results of a comprehensive and detailed examination, from floor to roof, of sixteen complete sections of the seam taken at points well distributed over the area.

The investigation has been carried out under the general direction of the South Yorkshire Survey Committee and under the supervision of Dr. L. Slater, the Department's Senior Officer of this Survey in the South Yorkshire area. The staff engaged upon the work were Mr. H. Berry, Dr. J. T. Burdekin, Mr. E. A. Shortland, Mr. N. Webster, and Mr. C. A. Moxon.

* Department of Scientific and Industrial Research, Fuel Research, Physical and Chemical Survey of the National Coal Resources No. 18. The Yorkshire, Nottinghamshire, and Derbyshire Coalfield, South Yorkshire Area; The Barnsley Seam. Published by H.M. Stationery Office, Adastral House, Kingsway, W.C. 2; price 2s. net.

At the Fuel Research Station commercial grades of coal from the Barnsley seam have been used from time to time in carbonization tests carried out in vertical and horizontal retorts at both high and low temperatures. This coal has been adopted as a standard medium-caking coal with which other coals tested may be compared.

The Barnsley seam produces 52 p.ct. of the total coal output of the South Yorkshire area. The ash content is nowhere high, the average being 3·4 p.ct. Somewhat wider variations are found in the moisture content, the average being 4·7 p.ct. On the ash-free, dry basis the volatile matter varies from 33·1 to 38 p.ct. There is little variation in the carbon content from a mean of 83·2 p.ct. The percentage of phosphorus in the whole seam is fairly high, as also is the calorific value (sometimes exceeding 14,000 B.Th.U. per lb.). The amount of fusain found is fairly high, in six cases reaching 3 p.ct.

An appendix to the report gives a general consideration of the uses of Barnsley coal.

The Miners' Federation and the Coal Situation

In which the writer welcomes signs of a saner outlook among mining trade union leaders

By "Observer."

Since the devastating coal stoppage of 1926 a change in spirit has overtaken Mr. A. J. Cook, the Secretary of the Miners' Federation. It is as welcome as it is notable. Evolution to moderatism has been a characteristic feature in the industrial education of many other trade union leaders, from the days of Mr. John Burns onwards. The common sequence of events in the career of practically all trade union leaders who have come prominently before the public eye and have remained there for a few years has been (1) a burning but ill-instructed zeal for the betterment of employees, (2) a development of experience with the hard facts of industry, which teaches that what is regarded as cupidity in employers is mostly a product of economic necessity, an effect rather than a primal trait, (3) an expanding realization that, for good or ill, employers and employees are in a common boat, that what threatens the one endangers the other, and (4) a willingness thereafter to work more pacifically and co-operatively with employers in overcoming common enemies.

It is still so fresh in memory how intensely large sections of the community held Mr. Cook to be the "arch villain" of the coal industry that his emergence into grade (4) can be noted, not critically, but gratefully. It is the best testimony which can be produced that, however mistaken his earlier outlook, his convictions were sincerely held. How completely Mr. Cook's "education" has been effected may be exemplified by a single quotation from an interview he gave two or three weeks ago to a Press correspondent. On the current negotiations anent mining hours and wages, Mr. Cook said: "I feel very satisfied at the moment about the outcome of last week's negotiations. My great regret is that we failed to reach an agreement *direct* with the owners. However, we parted with the greatest feeling of personal friendliness, and I think the owners as a body must appreciate our efforts to face the economic situation. . . . It is certainly my desire that we should get together again as soon as possible."

We would fain believe that the spirit which breathes through this quotation is typical of mining trade union circles as a whole. There are strong indications that this is the case. If the moderatists can keep in subjection the extremists, mining will more quickly emerge triumphant, and the Miners' Federation more worthily justify its existence. Owing to the illness of Mr. T. Richards, the acting President at the Miners' Federation conference held in Blackpool was Mr. E. Edwards, of Northumberland. His address from the chair was dispassionate, and more logical and pacific than some of its forerunners. All thoughtful observers realize that the ills of the mining industry cannot be fully cured without the hearty and ungrudging co-operation of the men's trade unions, of which, save for the Miners' Industrial Union, the Federation is the pivotal body. It is appropriate that at a time of great industrial depression a man has been found to take the chair who is courageous enough to declare for peaceful and constructive endeavour.

Early in his address Mr. Edwards said: "The result of the recent negotiations must be judged not only in the light of the men's reasonable demands, but of the economic condition of the industry." Though seeing nothing to be jubilant about in the twelve months' truce which is sought to be established by the recent Act, Mr. Edwards continued: "Contrasted with the risks of a national stoppage and the uncertainties to the men and the trade which would have been a national calamity, we can at least declare a certain amount of common-sense satisfaction." What a difference it would have made to the outlook for mining to-day if this common-sense view had prevailed and prevented the stoppages of 1921 and 1926.

Future Policy.

Mr. Edwards prescribes as the policy for the immediate future two essentials: (1) To raise the economic level of the industry, and (2) to make the Miners' Federation fully representative of mine workers of the country. We commend him for the order in which he places these two aspirations; there is little satisfaction in making the crowd bigger and more pressing round a fainting subject, especially if gain be the object, when his pockets are empty. Mr. Edwards is right when he says: "If this industry cannot be raised to a higher level we cannot hope to improve even our present miserable standards and conditions without an outside subsidy to help."

The Federation's policy (*vide* Mr. Edwards) is (1) elimination of all internal competition, raising the general price level, co-ordination and control by a strong central body; (2) elimination of all waste in administration and working of collieries; (3) a national levy to facilitate export trade pending international agreements; and (4) the fullest possible application of scientific methods in the production, treatment, and utilization of coal. If we were putting these in order of urgency, we should bracket (2) and (4) as more calculated to produce healthiness than (1) and (3). As everybody knows, the Coal Mines Act, 1930, aims at achieving No. (1), and the danger is that, having put coal prices high and dry above competition, the policy on (2) and (4) will be one of "go-easy." There is nothing so stultifying to initiative and perseverance as a protected market which assures profit without effort, though we may hold a watching brief as to whether measures of this kind are justifiable, in circumstances, as a temporary expedient. In any event, elimination of internal competition by Act of Parliament is both wrong in principle and unjust to other industries which are afforded no such protection.

Mr. Edwards states that the Federation's policy as outlined above has been stated "on numerous occasions." If that is so, neither the publicity given to these occasions nor the energy with which the policy has been prosecuted has been comparable to their obvious importance to mining economics. The Federation has not distinguished itself as an enthusiast on mining economics, but has rather frittered away its energies on questions of wages and hours. That, maybe, was enough twenty years ago, but it is woefully short-sighted under the conditions of to-day, when too tenacious "fighting" for hours and wages is simply beating the air.

The Cat Out of the Bag.

It is hardly surprising that Mr. Edwards proves himself an enthusiastic supporter of the Coal Mines Act, 1930, for he sees in it machinery which, pushed to its limit, will fill the coffers of the mining industry at the expense of coal users. But he is a little premature in blaming the coal-owners for not more quickly bringing that machinery up to prescription. He says: "Surely it is the owners' business to ensure that the means to pay (better wages for improved conditions) are within the industry. The Mines Act was designed expressly to give them that power, and they should use it." That is letting the cat out of the bag, and no mistake. When the Act was being forged, we were first told that it would not raise the price of coal to the general consumer; then that the price would be fixed according to capacity to pay; and so on. But behind it all we knew that there was no solicitude either for coal-owners or for the general coal user, but the deliberate intention of making the Act a collecting office to enable the coal industry to pay more wages for less hours at the expense of all other members of the community. No other aspiration could exist, for it was the Miners' Federation that was the driving force and dictator behind the Government which brought the Act on the statute book.

We will not chide Mr. Edwards too severely for his candour in owning up to the true object which forged the Act. But we may hope that the insularity of outlook which prompted the measure will develop into a wider outlook which will envisage the condition of the country as a whole, and a realization that the problem is much more complex than that of simply relieving coal users of money in higher coal prices to increase wages, shorten hours, and provide means for subsidizing exports.

Sympathy Put in Focus.

Nothing in the foregoing must be accepted as being unsympathetic to miners and the mining industry. We know that mining is an arduous occupation; but it has fallen upon evil times. These are no days for pushing the cry for improved conditions too far, and least of all at the expense of other unfortunate industries, each of which has its difficulties. We sympathize with the cotton and other

textile workers, those engaged in shipbuilding, and so on, and can even claim for the Gas Industry a measure of commiseration in having the *Damocles'* sword of higher coal prices held over its head the while it is fighting to maintain its position against an industry "run" by the very Government which endowed the mining industry with a protective Act. While rightly seeking the betterment of its own members, the Miners' Federation will be wise, and come out gainers in the end, if it puts its own troubles and disappointments into the common pool for the time being, and takes exclusively the broader vision of what will most quickly restore the country's prosperity. The parochial view of the miner has been almost "ridden to death." His cause has pushed many other vital questions in the Parliamentary arena into the background, and has caused others to have inadequate attention.

The Export Trade.

We turn to the export trade because, in a measure, its fortunes are linked with the home market. If exports are down there is a higher ratio of standing charges for the home market to bear. That ratio is intensified if, on top of it, subsidies are abstracted from the home user to retain or expand the export market against foreign competition. Mr. Edwards quoted figures showing how British exports had shrunk. For the first six months of 1931 they are down by no less than 7½ million tons. In 1930 the decrease on 1929 was 5 million tons. Other countries, says Mr. Edwards, and especially Poland, compete with disguised subsidies. It is easy to chide British owners with folly at "permitting" this state of affairs, but much more difficult to establish a corrective. If the time and attention of British owners had been less taken up by the consideration of wages, hours, and other matters which have originated within the ranks of the Miners' Federation they would have been freer to concentrate on the export problem. Mr. Edwards, therefore, cannot hold his organization wholly unresponsible for any opportunities which may have been lost in the export trade. Indeed, it was the 1926 stoppage which gave Poland its opportunity, and no impartial historian can hold the Miners' Federation blameless for that catastrophic event.

National Levy and Subsidy for Exports.

Mr. Edwards is all for a national levy in support of the export trade. He sees it from the Northumberland angle of vision, which is quite natural, since exports in that county and in Durham form a much bigger proportion of the output than in the Midland Counties, in which alone the practice of subsidy has been invoked. Mr. Edwards says: "This question of a national levy to assist exporting districts is one of extreme urgency. The position grows worse almost hourly, and even though wages are protected by law, unless something is speedily done we may find that before the year's guarantee has expired unemployment in the exporting districts will have increased enormously."

It is not very long ago that Durham and Northumberland coalowners and others engaged in the North-East export trade were protesting that the subsidy applied to Humber exports was merely increasing the output of that port at the expense of the trade higher up. If that is true, then it does seem that a generally applied subsidy would be futile, acting as a bonus on existing business rather than a lure to additional business. Even if a subsidy succeeded in winning back fresh business, it could only be retained by making the subsidy permanent; even this is problematical. A subsidy or additional subsidy applied in Britain would be followed by a subsidy or additional subsidy applied in Poland or whichever country the specific was directed against. Subsidies are unadulterated warfare, and as such should be regarded.

Other Questions.

Mr. Edwards believes in amalgamations and in rationalization, but subject to protection for those who may be displaced from employment. There is some justification for this attitude. Immense hardship can be caused by closing down a colliery, not only to miners who lose their employment, but to the community which ministers to their wants—shopkeepers, the local authority which has to raise the money for social services, and so on. Mr. Edwards has only the miners in view, whereas it is a bigger question than that, and should be approached as a national question demanding national prescription. If there is to be relief at all, it is not enough to placate the miners and leave local government bodies and others in a state of confusion as to how they are to carry on. Nationalization must not be applied too brutally in the interests of one industry only, but must have consideration from all points of view. As so far applied in Britain, it has probably done more harm than good—unquestionably so to many people indirectly concerned, whatever benefits may have accrued to the chief authors.

The Federation's acting President says the Government and coalowners should explore the possibilities of the hydrogenation process. We presume he knows that something in this direction has been done already, and that further effort seems to be awaiting economic opportunity. Still, a country which can spend £60,000,000 in six years on the beet (sugar-producing) industry, might be a little more energetic on the matter of hydrogenation—a view held by Mr. Edwards which can be wholly endorsed.

It is satisfactory to have from Mr. Edwards the assurance that the miners do not anticipate a crisis in July, 1932, when the short-date Act passed a few days ago has run its course. He says: "We call upon those charged with the conduct and control of the industry to work in a real national sense for peace rather than to talk of strife." That is the right command to issue in these stressful days. At their peril will either owners or men disregard it.

Nationalization and Amalgamation.

This hardy annual came before the Conference. The resolution in its favour was moved by Mr. Joseph Jones, the Yorkshire Secretary, who is a member of the Coal Mines Re-organization Commission. Mr. Jones said that the Commission attached great importance to the nationalization of minerals, and had informed owners that, unless the proposal matured, some statutory restraint would be necessary on the freedom of royalty owners to dispose of their property as they please. He claimed that two parties in the House of Commons are in favour of this, which is probably true, since as between nationalization of minerals and of collieries there is a gulf of difference.

That the Miners' Federation has greatly moderated its views on nationalization is indicated by the sharp reproof which one delegate who favoured confiscation received—that this policy would never commend itself to the people of this country. Another delegate remarked that the proposal to nationalize would not provide the Elysium some miners envisaged. Still another delegate thought it was little use to take over coal production on which money is being lost, and sell coal to those who would "treat it scientifically and reap all the profit," which suggests the taking also of coke ovens, and possibly gas-works. In the end, the resolution was carried unanimously, as it has been in some previous years, and will, we anticipate, be passed in many future years. Nationalization is further off than it was ten years ago.

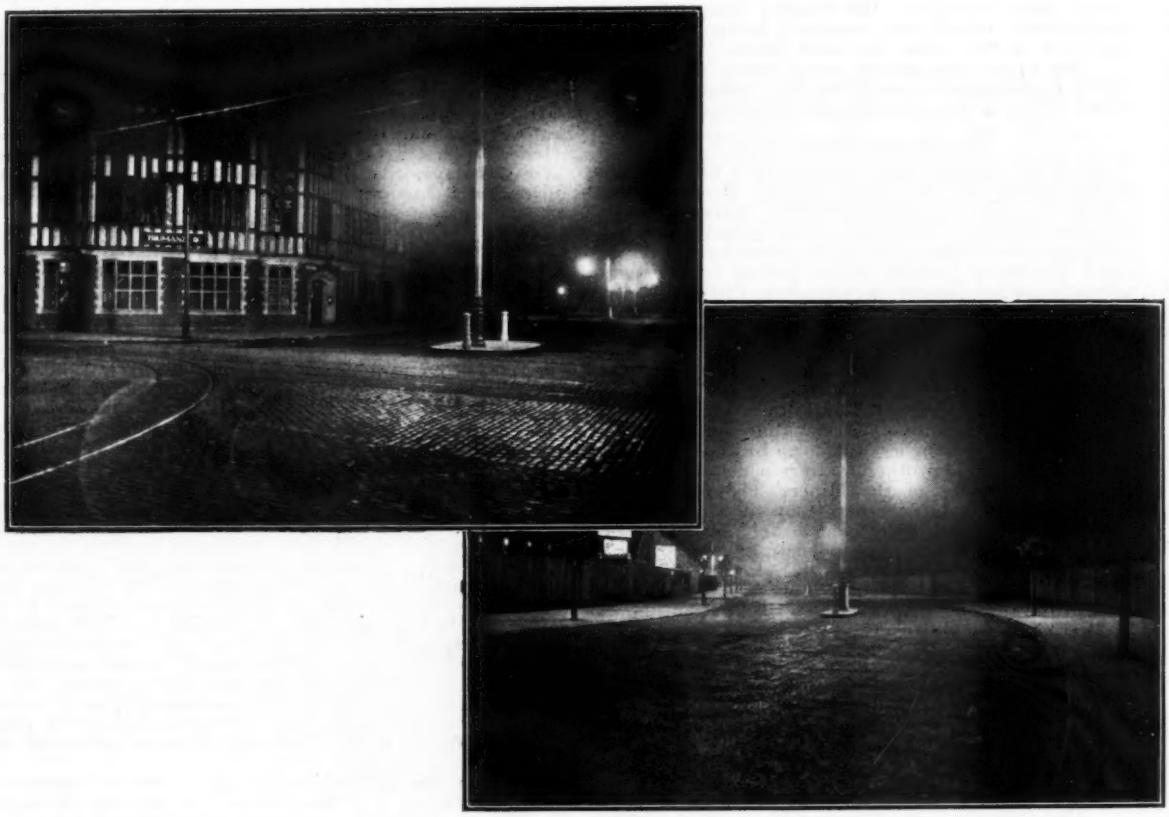
Though the Federation ploughs a lonely furrow on nationalization, it is less isolated on the idea of amalgamating, co-ordinating, or reconstructing coal mines. A Commission is already formed under the 1930 Act to induce such schemes, and quite a lot of people expect great things from it, the Federation among them. The Conference had the benefit of Mr. Jones' views and some informative figures. We learn from these that in 1928 there were 2159 separate mines, representing 1238 different undertakings, and an output of 258,000,000 tons. Of the 2159 mines, 1129 representing 372 different undertakings produced 236 million tons of coal, or 91½ p.ct. of the total, leaving 1030 separate mines, owned by 866 different units, to produce the balance of 22 million tons, or 8½ p.ct.

It is not quite clear what Mr. Jones' object was in giving these figures, but if they are intended to convey the impression of tremendous opportunity for amalgamation they are unconvincing. A little calculation shows that the "top" half of mines give per undertaking an output of over 630,000 tons for each of the 372 controlling undertakings. These are big units, and we may rest assured that, if economic circumstances permitted further consolidation, the owners would be ready to consummate it without the driving force of a Re-organizing Commission. On the other hand, the "bottom" half have an output per undertaking of 866 owners of only 25,000 tons. But the top half has already either organized or amalgamated on the big scale to such a degree as to account for 91½ p.ct. of the total British output. The scope for amalgamation is mainly limited to the "residuum" of 8½ p.ct. It is not clear that even here there is much scope, for many of the pits will be so situated as to make linking up with others impracticable. It would seem that, if left alone, the automatic operation of the law of "the survival of the fittest" would account for these, if they are being worked at a cost which does not favourably contrast with the bigger undertakings.

For the above reasons, we hardly share the optimism that big things are to come from amalgamation *per se*, and we have yet to be convinced that the rather costly Commission which the State has created will produce results sufficient to justify its existence in excess of what would have resulted from leaving the matter to private enterprise and initiative.

HIGH-PRESSURE GAS LIGHTING

Illuminations of Coventry's new central thoroughfare, Corporation Street



The thoroughfare is 80 ft. wide, with two 15-ft. sidewalks. The lamps are suspended at a height of 18 ft. 6 in. from the ground level from double arm steel tubular columns, the columns being situated down the centre of the thoroughfare. The whole scheme has proved highly successful, and, as will be observed, the illumination of the road surface is very evenly distributed. The effect of the lighting would be enhanced by the erection of modern buildings. At the present time, without the aid of these, the lighting does not show up to the best advantage.

IN CONTINENTAL COUNTRIES

Abstract Translations from the Technical Press of France and Germany.

GAS TARIFFS WITH REFERENCE TO THE UNPROFITABLE CONSUMER.

The question of tariffs is discussed by A. Nübling, of the Tariffs Committee of the German Union of Gas and Water Engineers in "Das Gas- und Wasserfach," 1931, 74, 717-720 (July 25).

In the first instance it is shown that, for a particular case, the average standing costs per consumer work out at 2s. per month. The proportional costs are assumed to be 3s. per 1000 c.ft. of gas made.

The effect of various kinds of tariffs is discussed with the help of a series of graphs. The conclusions arrived at may be summarized with the help of the following examples based on appropriate British prices and volumes, so as to illustrate the various points brought out. The examples show what types of tariff are adapted to reduce the losses from small consumers, and what types are not. Conditions are not as simple in all works, as has been assumed for simplicity's sake in the examples; but it is, nevertheless, not difficult to draw the proper conclusions for any particular works.

The examples are chosen in such a way that the charge each month for a consumption of 1000 c.ft. in the month amounts to 6s.

(1) *Uniform rate of 6s. per 1000 c.ft.*

This type of tariff is unsuitable both from the point of view of eliminating unprofitable customers and from that of encouraging increased sales. Consumption is restricted, since the price is high whatever the consumption. Costs are only covered when the monthly consumption reaches 666 c.ft., corresponding with a monthly bill of 4s. The monthly loss for a monthly consumption of 333 c.ft. is 1s., and for no consumption 2s.

(2) *Uniform rate of 6s. per 1000 c.ft. with a minimum charge of 2s. per month.*

This is much more favourable to the undertaking.

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PARKINSON
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The NEW SUBURBIA Gas Cooker with the AJUSTO Regulator is an asset in every Showroom, because of its attractive appearance and moderate price.

The NEW SUBURBIA with single burner oven and bottom-oven-flue-outlet, meets all the requirements of domestic cooking more efficiently and economically than any other gas cooker on the market. It is supplied in Mottled Porcelain Enamel and also a large variety of attractive self-colour finishes.

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Fruit

¶ ***Typical Examples:***

GREENGAGES

"Regulo" Setting Mark ½
Time 45 Minutes

Method. — *Choose fruit which is not too ripe; remove the stalks, wash and pack into hot jars. Pour in boiling syrup (¼ lb. sugar to 1 pint water) to within 1 inch of the top. Fix the new rubber rings, etc., and heat the jars in the oven for 45 minutes with the "Regulo" at mark ½. Remove the jars, tighten the screw tops and, when cold, test the seal.*

TOMATOES

"Regulo" Setting Mark ½
Time 1 hour

Method. — *Choose small, rather under-ripe tomatoes. Remove the stalks and pack the tomatoes tightly into hot jars by tapping on a folded cloth. Care must be taken not to break the skins. Add 1 teaspoonful of salt to each pound of tomatoes and pour in boiling water to within 1 inch of the top. Fix the new rubber rings, etc., and heat the jars in the oven for 1 hour with the "Regulo" at mark ½. Remove the jars, tighten the screw tops and, when cold, test the seal.*

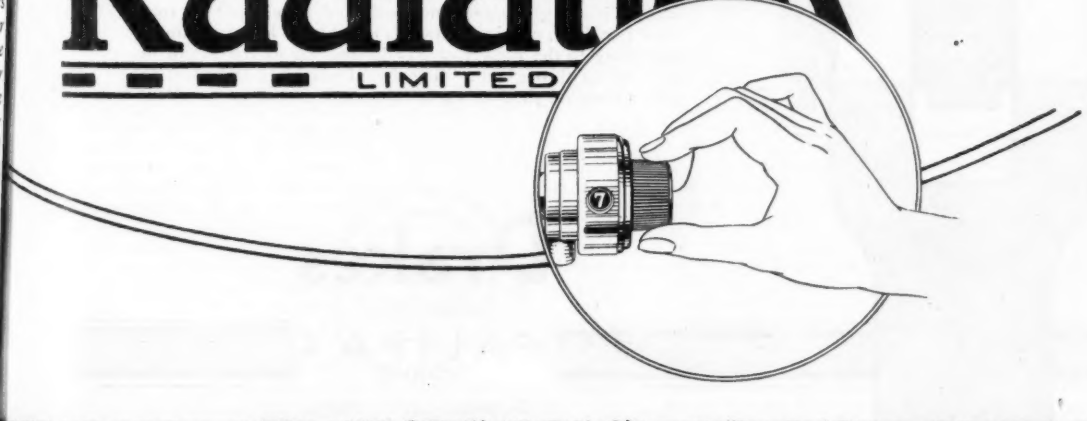
Vegetable Bottling:

e new, simple way in the NEW WORLD" Regulo-controlled oven.

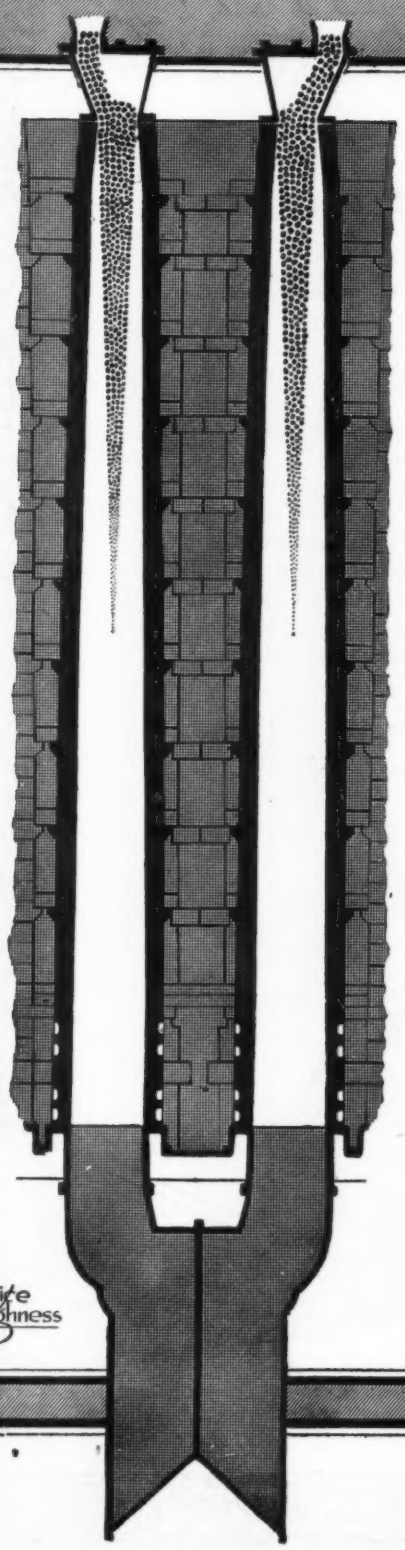
FROM the cooking of single dishes in the oven, to the simultaneous cooking of the whole family dinner: then a typical Hotel menu—six courses, all in the oven at the same time and at the same "Regulo" mark: and now – the bottling of fresh fruit and vegetables by means of the "Regulo" oven-heat controller. . . . . This is the progressive story of "New World" accomplishment — the story of continuous improvement, of providing for the Public and the Gas Undertaking a cooker that can thus be made the practical vehicle for even the most advanced present day ideas and tendencies. After careful experimental work in the Radiation Research Kitchens, the necessary data for bottling successfully a whole range of fruits and vegetables has been compiled. Results have shown that this method can be entirely relied upon to keep the fruits, &c., in perfect condition. It is much more simple and economical than the old Hotplate method —and of course no thermometer is needed.

A small pamphlet giving the mode of preparation, "Regulo" settings, &c., will be ready for issue shortly, and supplies will be obtainable free from Radiation Ltd. (Publications Dept.), 164, Queen Victoria Street, London, E.C. 4.

Radiation
LIMITED

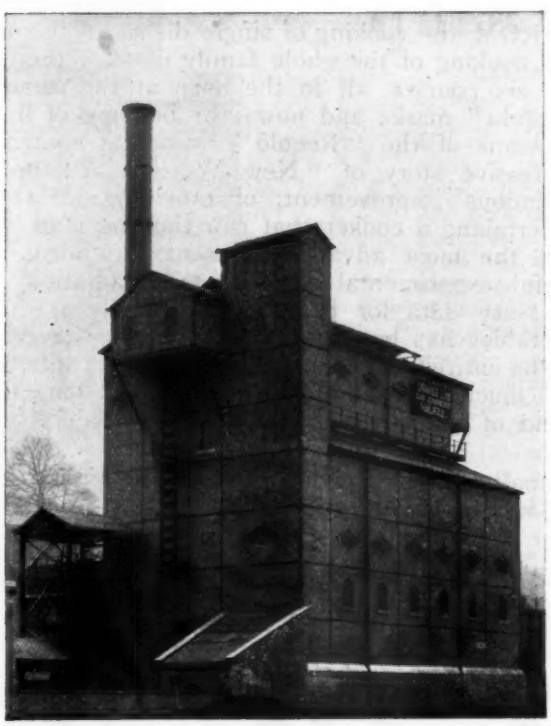


DRAKES VERTICALS



BINGLEY INSTALLATION

INAUGURATED 21st MARCH, 1930



The Vertical Retort Stack consists of 16 Retorts, built in four settings of four and arranged in units of two. Each Retort has a guaranteed nominal coal throughput of four tons per diem, and in addition is capable of being steamed, according to the quality of gas desired, up to the extent of 25% of its throughput. The four Beds are guaranteed to give a nominal yield of one million cubic feet of gas per day.

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YORKS

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(Day and Night)
Telegrams: "Draketed, Halifax"
Special Address for Night Telegrams:
"Phone from Leeds, Draketed, Halifax 2741"

Even so, most customers using less than 666 c.ft. per month are unprofitable, but the maximum loss from any customer is limited to 1s. The uneven effect of the minimum charge is noteworthy. With no consumption, the loss is *nil*. It rises to 1s. per month as the consumption rises to 333 c.ft., and falls again to zero as the consumption rises further to 666 c.ft. Losses could be eliminated altogether if the minimum demand charge could be fixed in respect of 666 c.ft. per month, but this is too high and would unduly prejudice the smallest consumers, since even for no consumption there would be a profit from the householder of 2s. per month, though this would fall to zero at a consumption of 666 c.ft.

(3) *A block system.* 6*s.* 6*d. per* 1000 *c.ft. for the first* 750 *c.ft. in the month,* 4*s.* 6*d. per* 1000 *c.ft. for any additional gas consumed.*

This shows better results from the small consumer than does the uniform tariff, but, by itself, cannot eliminate losses. In the example, the consumption at which profit begins has been reduced from 666 c.ft. per month under the uniform tariff to 570 c.ft., and this could be still further reduced by a larger charge for the first block.

(4) *Sliding scale.* 7*s. per* 1000 *c.ft. when the month's consumption is less than* 750 *c.ft.,* 6*s. per* 1000 *c.ft. when the consumption exceeds* 750 *c.ft.*

The situation is similar to that of the block system, but the reduction in price for large consumptions must be much smaller than in the block system if a similar revenue is to be obtained. It has a disadvantage compared with the block system, since passage from one scale to the next causes irregularities.

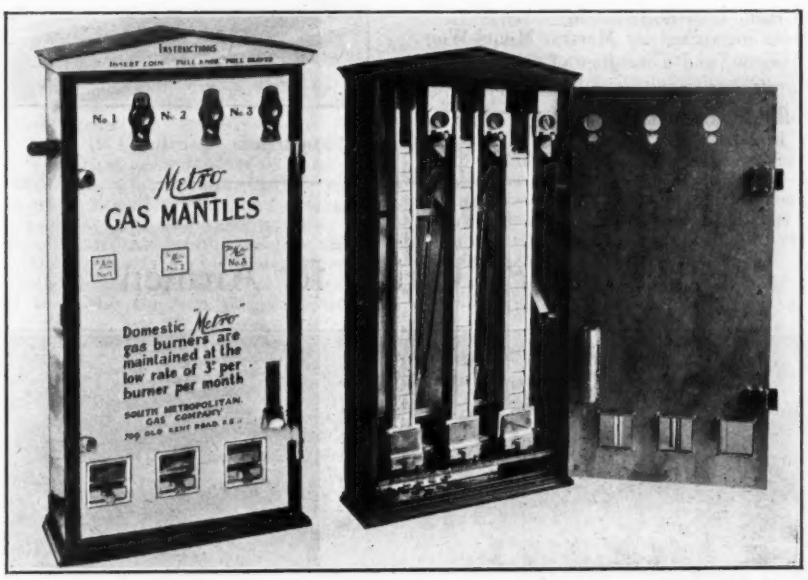
(5) *Service charge of* 2*s. per month and uniform price of* 4*s. per* 1000 *c.ft.*

This is very well co-ordinated with the manufacturing costs, and, with a suitable service charge, serves to eliminate the unprofitable consumer completely. Moreover, there is a steady increase in profit with increase in the gas consumption. The most important consideration, however, is that there is no undue burden on the small consumer. Also, there is every incentive to increased use of gas.

(6) *Combined service charge and block system. Service charge,* 1*s.* 4*d. per month;* 5*s. per* 1000 *c.ft. for the first* 750 *c.ft. in the month,* 3*s.* 8*d. per* 1000 *c.ft. for amounts in excess of this.*

This is still better, since the higher charge for the initial consumption enables the service charge to be reduced, whereby the smallest consumers are benefited. Thus, not only are the smaller customers treated fairly, but there is not too big a burden on the good customers. This scheme nevertheless involves some unprofitable consumers, but these can be mostly eliminated by fixing a minimum charge of (say) 2s. 6d. per month, which would be equivalent to the charge for a consumption of slightly less than 250 c.ft. per month.

Gas Mantle Vending Machine


No. 1
No. 2
No. 3
Metro
GAS MANTLES
Domestic Metro gas burners are maintained at the low rate of 3' per burner per month
SOUTH METROPOLITAN GAS COMPANY

COLLIS MACHINE USED BY THE SOUTH METROPOLITAN GAS COMPANY.

In our columns a few months ago we mentioned that slot machines for gas mantles were being installed in various places in South London. At the time we said: "The new machines mark a further step forward in the twenty-four hour service system which the Gas Industry has given to the public during the last hundred years."

We are now able to give a description of the type of gas mantle vending machine manufactured by Messrs. J. Collis & Sons, Ltd., of London. Fifty of these machines have recently been supplied to a Gas Company who, we understand, are extremely pleased with the results, as extensive sales of mantles have been made. Frequently their night watchmen have to refill the machines within two hours; also, they have not taken a single counterfeit coin. And apart from the sale of mantles, the installation of these machines has a definite advertising value.

Although simple in construction, the Collis gas mantle vending machine is most ingenious in operation, as it rejects light coins, discs of cardboard, tin, aluminium, or any material that can be magnetized. In addition, it will not take coins which are over-size or under-size, and will not pass a coin without a milled edge. In short, all counterfeit coins are rejected. The rejected coins are returned to the customer in a "reject slot," but they first pass a visible aperture, so as to prevent such coins being trapped by foreign material.

Only one mantle can be obtained for one sixpence, and coins cannot be placed in the machines when the slots are empty. The machines can be supplied with one, two, three, or more slots for the sale of any number of sizes of mantles. We must mention, however, that, if one size of mantle is sold out, in a multiple slot machine, the other slots are not affected, as each slot works entirely independently of the others.

The machines are supplied mounted complete on stands, and are each fitted with two independent "Yale" type locks and keys. No two keys are the same on any two machines. The cases of these machines are made from lead-coated sheet steel so as to prevent oxidization, and fittings such as springs are coated with lacquer so as to prevent rust. The cases are painted with any colour enamel to suit the customer's choice.

NOTES ON PLANT AND PROCESSES

"From Dustcart to Dynamo."

An attractive brochure recently published by the Woodall-Duckham Company describes the firm's refuse disposal plant, which is also utilized for the generation of electricity. This system of incineration is claimed to satisfy the demands of the power engineer as to constant steam characteristics, to render the refuse (including the dust) entirely innocuous, and at the same time to be revenue producing, not only by the sale of steam but also by the sale of a valuable clinker and a maximum recovered proportion of tins and metals.

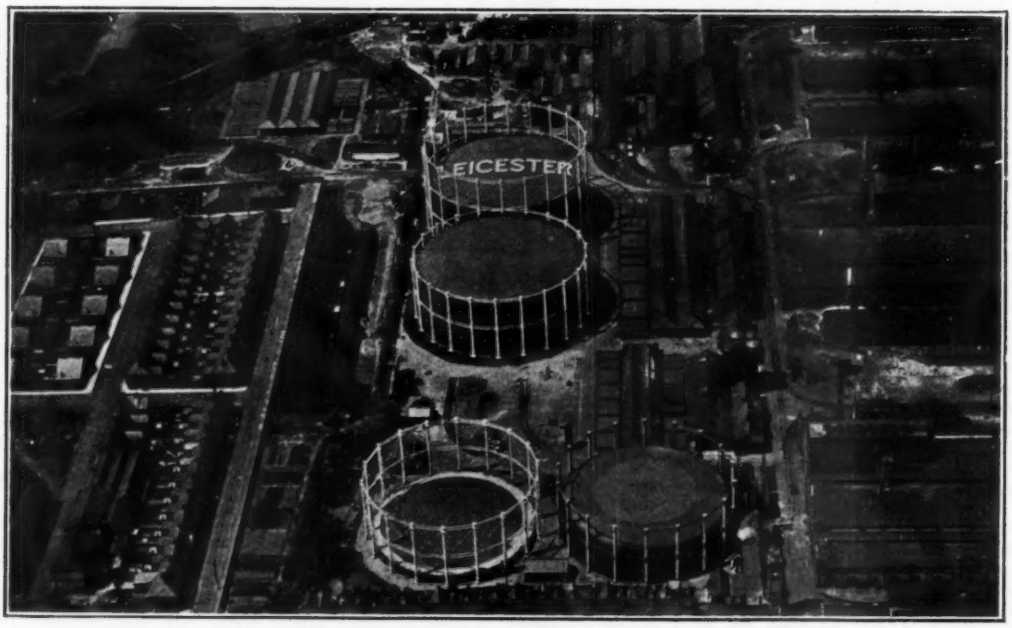
A Novel Monel Metal Window Display.

The unusual nature of the window display in the Canadian Government's Office in Hope Street, Glasgow, is at present attracting large crowds. This miniature exhibition is designed to show the large number of industries in Glasgow and the West of Scotland in which monel metal is employed.

The exhibits include a variety of articles manufactured from sheet, such as kitchen sinks, corrugated joint rings, buckets, trays, sterilizers, road spots, &c.; various articles produced from hot rolled and cold drawn bar, such as turbine blading, tubing, wire rope, wire cloth, springs, &c.; and steam valves, castings, yacht fittings, impellers, plug cocks, &c., produced from ingots.

The display has been organized by Messrs. Monel-Weir, Ltd., of Cathcart, Glasgow, and a number of Glasgow and West of Scotland Manufacturers with the kind co-operation of the Canadian Exhibition Commissioners.

Leicester's Guide to Airmen



[*Air Photo., by Aerofilms, Ltd.*

The above is an aerial photograph of No. 4 gasholder at the Aylestone Road Works of the City of Leicester Gas Department, showing the word "Leicester" which has been painted on the crown, in letters 30 ft. deep by 6 ft. wide.

THE "JOURNAL" TECHNICAL RECORD

Which contains Full Reports of Meetings of Gas and Allied Associations

Gas Institute of New Zealand

FURTHER EXTRACTS FROM THE PAPERS AT THE SEVENTH ANNUAL MEETING

THE VALUE OF TAR TO SMALL GAS-WORKS.

By T. Dix, of Cambridge.

The large dehydrating plants in the cities are not possible in a small gas-works, so I would like to give a description of our small plant which is giving every satisfaction in the preparation of tar for roads. The plant consists of an ordinary 600-gallon second-hand boiler fitted on a brick foundation and lagged with a coating of ashes. The outlet pipe consists of a 1½-in. pipe 3 ft. high, then a 1-in. pipe is led to a coil submerged in water constantly flowing when the plant is working. The plant is a very crude one and could easily be erected in any small gas-works at a comparatively small cost.

The question of why is it necessary to dehydrate tar may be brought forward, and the answer is this: Tar in its crude form is not a suitable compound for road-making, but when properly dehydrated is second to no other material for that purpose. In Cambridge dehydrated tar coated with fine sand was tried on a section of road subjected to very heavy and fast traffic for approval or otherwise of the Main Highways Board. This road was given two coats of tar and sand the first year and one coat the next two years and gave entire satisfaction. After inspection by the Highways Board it was decided to approve of a tar sealed road from Cambridge to Hamilton, a distance of thirteen miles, provided the tar was prepared to the same specification as the piece just mentioned.

In Cambridge the tar is pumped from the tar well, then run across to the boiler, no extra labour being necessary. It is then heated slowly until the light oils, &c., have evaporated, which generally takes about four hours. The firing from now on is very heavy, and continues so until the tar has been heated to 200° to 212° C. When this heat has been obtained the fire must not be drawn, and the tar left to cool. The only satisfactory method we found after a lot of experimenting was to bank the fire up and let the tar toughen until two days after the boiling. We also found that the tar was too hot to work satisfactorily the day after boiling. The spirits of tar and phenols that come away we use in the exhauster with good results, and by this have saved a considerable amount of money by supplying our own product instead of purchasing from outside.

Local council engineers are very hard to please and often place obstacles in the way of tar, but if we are able to show them we have a material that is of good quality, the prospects of commanding a ready sale for our tar should be much brighter.

There is quite a lot of cold emulsion bitumen coming on the market at a fairly reasonable cost, but there need be no fear of that for first coat work, as there is no material known that can take the place of tar for the first or second coat on a gravel or sand road.

We here in Cambridge sell dehydrated tar to the Streets Department at 9d. per gallon, and have no trouble to sell all we make. The cost of dehydrating tar works out at approximately 1d. per gallon, so you see it is a paying proposition to have a good material to offer at a reasonable price. I do not wish to make a long subject of this paper, but am of the opinion that small gas-works can enjoy the same benefits as large ones if they desire to do so.

We all have to remember that unless we supply the correct material we cannot expect to get business and success with local council engineers, who will not risk their reputation on an inferior article.

POINTS ON GAS METERS.

By Chas. E. Hibberd, of Wellington.

To illustrate the importance of having a meter of ample capacity installed, let us refer to the 5-light meter, with a nominal capacity of 30 c.ft. per hour. Assume that the gas pressure at the inlet of the meter is 27/10ths water column and that the couplings of the meter are ¾-in. bore. If we light a gas cooker to consume 60 c.ft. per hour, the meter will be able to supply that quantity of gas at 27/10ths water column, though it will be working at 100 p.ct. beyond its badged capacity. There will be an absorption loss of 5/10ths water column in the meter, making the pressure at the outlet 22/10ths.

Allowing an absorption of 2/10ths water column in the service line between the meter and the cooker, this reduces the gas pressure at the cooker to 20/10ths water column, which is the minimum possible for effective burning.

We then turned on a califont, which absorbs at least another 100 c.ft. per hour. This immediately raises the absorption loss in the meter to 15/10ths water column. Add to this 2/10ths absorption between the meter and the appliances, and we find that the pressure at the burners has dropped to 8/10ths, which means poor heating service, no matter how perfect the apparatus in use. This illustration serves to show how important it is for the gas engineer to consider the following points:

(1) The maximum consumption of gas by the apparatus installed.

(2) The capacity of the meter to suit local working pressure.

If the meter is overloaded by installing one of insufficient capacity, then the high absorption losses resulting mean inadequate pressure at the burners, consequently poor service, and, further, the meter will register slow, and materially swell the already undesirable amount of unaccounted-for gas.

The conclusion that this illustration brings us to—viz., that the lights type meter had served its day—was realized by the Gas Industry and meter manufacturers some years ago, with the result that the standard type meter was brought on the market. This in its turn was also found to be inadequate. The necessities of our time evolved the high-capacity meter in an effort to keep pace with the growing popularity in the use of gas, resulting in the installation of an ever-increasing variety of appliances on each circuit.

Let us consider the position, using the high-capacity meter with a badged capacity of 120 c.ft. per hour. Going through the same cycle of events as with the lights type meter, with cooker turned on to consume 60 c.ft. per hour the meter absorption will be 2/10ths water column. Add 2/10ths loss in the service line leading to the cooker, and we find the pressure at the apparatus to be 23/10ths water column. Turning on the califont consuming 100 c.ft. per hour, the combined consumption of gas would be 160 c.ft. per hour. The meter absorption would rise to 6/10ths water column, add 2/10ths loss in service line, and this leaves a pressure at the appliance of 19/10ths water column, which is barely sufficient for the appliances to give the result claimed for them.

If the meter is run at an overload pressure, it will need adjustment or even a full repair prematurely, adding extensively to the maintenance costs and giving annoyance to the consumers.

Let us take a gas company with an annual make of 1000 million c.ft. of gas per year, and give the very conserva-

tive figure of 2 p.ct. unaccounted-for gas directly attributable to the incorrect registration of gas meters on circuit. This amounts to a very considerable loss to the undertaking every year, it is suggested, of at least £1000 per annum. This great loss of revenue could certainly be considerably reduced, if not entirely eliminated, by installing meters of sufficient capacity, and so internally constructed as to resist the corrosive action of gas, this especially in modern practice where water gas forms a constituent of the supply.

The net result of the improved design of the high-capacity meter, as far as gas supply is concerned, is shown by the following comparison:

A 5-light meter has the same size casing as a 120 c.ft. per hour high-capacity meter. In the case of the 5-light meter it takes six revolutions to displace 1 c.ft., whereas in the 120 c.ft. per hour high-capacity meter it only requires three revolutions to displace 1 c.ft.

This means twice the capacity in the same size outer casing due to superior diaphragm design. It must be realized also that the valve mechanism in the high-capacity meter, while able to cope with the increased volume of gas per revolution only occupies the same valve chamber space as the mechanism in the lights type meter.

Comparative Size of Dry Gas Meters.

Type of Meter.	Size of Case.	Capacity per Hour.
2-lt. ord. meter	2-Lt.	12 c.ft. per hr.
No. 1 standard meter	2- ,,	30 ,, ,,
50 ft. high-capacity meter	2- ,,	50 ,, ,,
3-lt. ord. meter	3- ,,	18 ,, ,,
No. 2 standard meter	3- ,,	40 ,, ,,
80 ft. high-capacity meter	3- ,,	80 ,, ,,
5-lt. ord. meter	5- ,,	30 ,, ,,
No. 3 standard	5- ,,	60 ,, ,,
120 ft. high-capacity meter	5- ,,	120 ,, ,,
10-lt. ord. meter	10- ,,	60 ,, ,,
No. 4 standard meter	10- ,,	120 ,, ,,
240 ft. high-capacity meter	10- ,,	240 ,, ,,
20-lt. ord. meter	20- ,,	120 ,, ,,
No. 5 standard meter	20- ,,	210 ,, ,,
450 ft. high-capacity meter	20- ,,	450 ,, ,,

This subject of diaphragm design leads us on to another point of interest in gas meters—namely, the type of leather to use in meters. Broadly speaking, there are three classes of leather used—viz.:

(1) Vegetable tanned.
(2) Semi-mineral tanned.
(3) Full-mineral tanned.

Until recent years vegetable tanned leathers were entirely used and gave good service working in a straight gas. They were found, however, to deteriorate rapidly under the influence of water gas. When this weakness was revealed, research work was carried out, and as a result a semi-chrome tanned leather was brought into use. This type of tanning was extensively adopted and pioneered by the South Metropolitan Gas Company, London, who still, I understand, exclusively use this type of tanning. Of more recent years straight-out chrome leather has been introduced, and although I cannot claim to have had any experience of this type of tanning in the Old Country, I have found it extensively used in New Zealand. Judging by the condition of the meters, in for repair, that have come under my notice during the last five years in the Dominion, the straight-out chrome certainly appears to stand up better to the type of gas made generally in this country. I have found, however, that straight-out chrome, in common with other leathers, becomes detanned when brought into contact with metallic iron, thereby hastening decomposition. A suitable arrangement of the position and movement of the diaphragm leathers in the chamber will remove the possibility of this occurring.

LUBRICATION OF MODERN GAS PLANT.

By J. H. Pennington, A.M.I.Mech.E., A.M.I.E.E., M.S.A.E., of Dunedin.

The lubrication of gas-works machinery has made steady progress, and to-day the methods employed are a distinct advance on those that obtained comparatively few years ago. Nevertheless, there is still in many gas-works the human element to consider, and this can be a serious drawback to efficiency and economy. Closer supervision, assisted by more up-to-date methods and appliances, would go far towards placing the lubrication of the plant on a sounder basis, and would obviate a definite source of waste.

In following through the various stages of manufacture from the arrival of the coal at the works to the time when the finished product leaves the gasholders, it will be found in many cases that the lubrication of the different machines employed can be brought under closer control than that existing at present. To cite an example—the steam cylinder lubrication of such units as exhausters, washers, and tar, ammoniacal liquor, and boiler feed pumps is often taken care of by dose cups or hydrostatic lubricators, both of which methods are inefficient and wasteful, and are not to be compared with the more up-to-date method of applying oils by means of mechanical lubricators operated and controlled positively by a moving part of the engine or machine, and which is in operation only when the piston is moving.

Locomotives and Steam Cranes.

The locomotives are usually of the four or six wheel coupled saddle tank type. For the lubrication of the steam cylinder it has been found good practice to fit mechanical lubricators, which, used in conjunction with good quality oils, have secured excellent results. In some cases, ordinary displacement lubricators are used.

The permanent ways over which the locomotives in gas-works operate are generally intersected by points and crossings, and consequently the axles and motions are subjected to considerable shock loads. These conditions call for the use of a fairly heavy-bodied oil of good quality, which is fed usually by means of syphon oilers.

Success, not only in running, but also in the important matter of oil consumption, depends largely on the adjustment of the number of strands of worsted of which the syphons are composed, and on the care that is taken to keep the strands clean and free from dust and grit; therefore, the trimmings should be cleaned in kerosene at regular and frequent intervals, and be given constant attention to see that the worsted has not become cut or chafed. In this connection, it will assist greatly in keeping the trimmings in good condition if care be taken to see that the edges of the oil pipes, through which the worsted passes, are properly rounded off.

The methods of lubrication employed on the locomotives are applicable to the steam cranes.

Crushers, Elevators, Screens, and Conveyors.

Perhaps owing to the rough use to which they are subjected, and the dirty surroundings in which they operate, these units possibly receive less attention than any other part of a gas-works plant, and, in consequence, the wear and tear due to excessive friction are considerable, involving a serious increase in power consumption.

The lubrication of crushers, elevators, screens, and conveyors is generally taken care of by means of screw-down grease-cups, as it is found that, compared with oil, grease forms a more effective seal at the ends of the bearings in assisting to prevent the ingress of dust and grit. Some types of gravity buckets and tray conveyors are oil-lubricated, and are equipped generally with automatic gravity lubricators, which are operated by means of a suitable trip gear.

To give satisfactory results, the oil used on conveyors must necessarily be of a medium body in order that it may reach the bearing surfaces of links and pins. If a too heavy bodied oil be used for this purpose, it will form a collar around the joints of the links and prevent the oil from reaching the actual bearing surface.

Unfortunately, the lubrication of conveyors and elevators, beyond the fitting of grease cups, and promiscuous hand oiling, does not receive the care and attention which its importance demands. On the other hand, in some modern gas-works the matter has been given careful consideration, and compressed air jets are employed at regular intervals in order to clear away accumulations of coal dust and other impurities, prior to applying the oil by hand to the link joints, pins, &c. This is done preferably at a point where the links are leaving the sprockets at an angle, thereby giving the oil a better opportunity to work in between the faces.

In a modern elevator, the buckets usually run on flanged wheels. These wheels are hollow, and fitted with a spring loaded ball valve, so as to allow the oil to be placed inside by means of a gun.

Retorts.

In modern practice, vertical retorts predominate, and the outstanding lubricating requirements are in connection with the coke extracting apparatus, which is operated by means of worm and wheel gears, fitted to the lower portion of the retorts. The teeth of these gears, which operate in a bath filled with lubricant, are subjected to exceptionally heavy loads, the speeds are low, and considerable radiated and conducted heat has to be contended with. These conditions call for the use of a lubricant that

will maintain its usefulness at high temperatures, or, in some cases, a steam cylinder oil of heavy body may be employed. It is essential that the lubricant shall be of good quality to ensure an efficient lubricating film on the teeth, and one that will withstand the high operating temperatures over prolonged periods.

A residual mineral product which is practically solid at atmospheric temperatures has been found best suited for these gear boxes, as it is capable of retaining its lubricating properties at the high operating temperatures.

Regular attention should be given to the gears, and the lubricant in the bath should be drawn off and renewed at frequent intervals. If lubricants of inferior quality be used in these baths, excessive metallic friction will take place, causing pronounced wear and tear; this condition is indicated by the sharp knife edges on the worm and wheel teeth, which prevent the oil from forming an efficient lubricating film between the rubbing surfaces, thereby setting up abnormally high temperatures.

Where large horizontal retorts are in use mechanical charger appliances are generally adopted. These may be driven pneumatically, electrically, or by steam, the various designs and makes calling for special consideration in regard to their lubrication.

The capital cost of these machines is very high, and the conditions under which they operate are exceptionally severe; therefore, it is highly desirable to use high-class lubricants on them, to ensure uninterrupted service and to keep maintenance costs at a low figure. It will be appreciated that any irregularity in the performance of these machines may cause serious hindrance to gas production.

Water Gas Plant.

The turbo-blowers employed with water gas plants are coupled usually to small high-speed steam turbines, which are lubricated by means of either drop oilers or a gravity or pressure circulating system. The high speeds and fine bearing clearances of these turbines call for the use of a high-grade straight mineral oil of light body possessing rich lubricating properties. In gravity and pressure circulating systems, it is essential that the oil shall be of such a nature that it will separate readily from any water or other impurities with which it may become contaminated. A suitable high-grade oil will resist the disintegrating effect of water for long periods, whereas an unsuitable or low-quality oil will break down quickly when subjected to the severe operating conditions that are usually encountered in this type of machine.

The life and useful service of a lubricating oil used in gravity and pressure circulating systems can be extended considerably by careful handling. In the larger installations it is good practice to withdraw at frequent intervals (say) from 5 p.ct. to 10 p.ct. of the total oil in circulation to be treated in steam-heated tanks for the removal of water and other impurities. Subsequently filtration through suitable filtering apparatus will enable the oil to be used over and over again in normal service. When large quantities of oil are in use it is becoming common practice to employ centrifugal or other separators which accomplish the treatment referred to in one operation. In many plants it is customary to discard the used oil from turbine circulating systems for employment on rougher work. Experience has shown, however, that by treating the oil carefully in the manner just described, and particularly where a high-grade oil is in use, it is possible to retain it in service on the higher class work for indefinite periods with economical results.

Coke-Handling Plant.

The general lubricating requirements of the coke-handling plant are similar to those that have been referred to already in relation to the elevators and screens of the coal-handling section.

Where overhead, electrically-driven coke-handling plant is installed, it is necessary to give special attention to the lubricating requirements of the electric motor bearings, which may be either ring-oiled, or, in the case of ball bearings, provided with grease lubrication.

In an electric motor, it is necessary, due to electrical considerations, to have small clearances between the rotor and the stationary windings, and, consequently, fine clearances in the bearings. These fine clearances and the high speeds at which the motors operate call for the use of a light-bodied oil that will spread readily and maintain an unbroken film over the bearing surfaces. Therefore, the oil used must be uniform in quality and not have any tendency to gum or thicken up with continued use. In order to take proper care of these bearings the oil in the reservoirs should be maintained at such a level that will ensure an adequate supply being carried up to the bearings surfaces by the rings. The oil-wells should be emptied periodically, and cleaned thoroughly, after which they should be refilled with fresh oil. It should be remembered that cleanliness of the bearings is of the utmost importance and that particles of dirt and grit which may enter the oil wells will settle to the bottom more readily with a correct light-bodied oil in use than with an unsuitable oil of inferior quality.

Electric motors fitted with ball bearings and having grease lubrication require a grease which will form an efficient lubricating film and have no tendency to channel or form acidic properties liable to attack the highly polished surfaces of the balls and ball races. Periodically these bearings should be cleaned and washed with petrol and repacked with fresh grease, as grit and dirt are liable to enter and cause trouble.

In some cases geared electric motors are employed, the gear running in an oil-bath. To lubricate these gears efficiently an oil of heavier body than that used in the electric motor bearings should be employed.

General Gas Machinery.

The lubrication of gas exhauster units calls for careful consideration, and its neglect may result in endless trouble.

There are two types of gas exhausters in common use—(1) the revolving bladed drum which is direct-coupled to a steam engine, or which may be belt driven; (2) the turbo-exhauster which is generally direct-coupled to a high-speed steam turbine.

The internal lubrication of the drum type gas exhauster is determined primarily by the condition of the incoming gas. Where there is little suspended tar present and the gas is clean a high-grade straight mineral oil will be found suitable; but where suspended tar and foul gas are present in quantities it is advisable to use a specially compounded high-grade oil to meet the conditions.

It will be seen, therefore, that the temperatures of the gas, the quantity of suspended tar present, and the cleanliness of the gas have a definite influence upon lubrication. Oils are now manufactured which will take care of all conditions experienced in a gas exhauster.

The methods of lubrication employed in the revolving bladed drum type exhauster are by means of self-contained drip-feed oilers; or by a pressure system which embodies the use of a reservoir from which oil is expelled by the pressure of the gas at the outlet of the exhauster; or by mechanical appliances either in the form of containers with hand pump attachment which feeds the lubricant through the end of the shaft; this shaft is suitably drilled to form an oil passage to the vanes requiring lubrication. Lubrication may also be effected by means of mechanically-operated lubricators having a common container from which several independent feeds are led to the various points requiring lubrication. As is the case with a cylinder lubrication of steam and gas engines, the last-mentioned method of application is the most efficient and economical, the feeds of the lubricator being under positive control and so regulated that it is possible to take care of the variable speeds encountered. Another advantage is the fact that, due to the oil being constantly under pressure, the jets are prevented from getting choked with tarry deposits.

In regard to turbo-exhausters, the gas end of these units does not require any internal lubrication. This type of exhauster is driven by a steam turbine which operates at very high speeds and requires the use of a light-bodied high-grade straight mineral oil that will withstand the considerable punishment to which it is subjected in circulation, and which will not tend to oxidize should it be brought into contact with impurities.

The need for a high-grade oil in turbo-exhausters is illustrated admirably in a case which came to light recently, and which emphasizes very strongly the wide difference that exists between high-grade lubricating oil and one of inferior quality. It refers to a certain gas-works where a cheap oil was in use and giving reasonable satisfaction on one of their turbo-exhausters. The time came when demands for output made it necessary to increase the speed of the turbine, and the oil in use broke down with disastrous results. The engineer in charge was prevailed upon to put in a high-grade oil, which, from a physical point of view, had readings identical with those of the cheap oil previously in use. The outcome was, however, that by the introduction of the high-grade oil the desired speed was attained and the turbine operated under normal temperature.

Scrubbers and Washers.

The care and upkeep of these units, which may be of vertical or horizontal type driven through reducing gears by a steam engine, depend almost entirely on the human element. The bearings are fitted usually with screw-down grease-cups, and the reduction gears, being mostly of the open spur type, require a lubricant similar to what is used in the extractor gear. After thoroughly cleaning the teeth, the lubricant is applied hot, and will effectively

cushion the teeth, reducing the frictional load to a minimum.

The steam engines driving the scrubbers and washers are usually of simple, single-cylinder type, equipped with an old-fashioned dose cup to the cylinder or to the valve chest. The external parts may be fitted with syphon oilers, or in some cases provision is made for only hand-oiling. The exposed positions in which these steam engines are placed are not conducive to economy and efficiency of operation; but these shortcomings can be minimized by preventing condensation in the steam pipes and cylinders, by paying proper attention to the lagging of these parts. More efficient operation can be secured also by adopting suitable mechanically-operated lubricators to feed regulated quantities of oil to the cylinder rather than by relying upon a precarious method of application as represented by the dose cup.

Stricter attention might be given to external lubrication by seeing that the syphon wicks are cleaned periodically, and that the right number of strands are used to give efficient lubrication with the minimum feed.

Finally, a suitable housing or covering should be erected to give adequate protection to the engine against weather conditions.

The lubrication of steam pumps for ammoniacal liquor is confined generally to the steam cylinders and valve chests and to a few external parts which usually are hand-oiled. In some cases, however, the pumps are driven through gears and belt drives from shafting, when additional attention is required for the lubrication of the gearing.

Although dose cups are usually fitted to the steam cylinders and valve chests it will be found possible, in certain circumstances, where a number of these pumps are installed in one pump room, to fit in a multiple-feed mechanical lubricator in a suitable position and to take the feeds to various points on the steam supply line. Excellent results have been obtained in this manner, and the use of high-grade lubricants has been attended with economy and efficiency, as compared with that given by the use of dose cups and cheaper lubricants.

Gas Compressors or Boosters.

These units are driven by a large variety of methods, and for the time being we can confine our remarks to the lubrication of the gas compressor cylinders and pistons of the reciprocating types. The lubrication of the driving units is dealt with later in relation to prime movers.

Gas compressors or boosters operate at varying speeds which are dependent upon the gas pressure required. Lubrication of the gas compressor cylinders and pistons is effected usually by means of a mechanically-operated lubricator feeding oil direct to the gas cylinders themselves. The operating conditions call for the use of a high-grade straight-mineral oil of medium body. The use of a suitable oil of good quality fed in closely regulated quantities by the method referred to will ensure efficient and economical results.

High-speed turbo-type boosters which are electrically or steam driven follow very closely the steam turbine practice referred to in the remarks regarding turbo-exhausters, except in cases where special designs of ball or roller bearings are used and grease lubrication is arranged for.

Where speed increasing or reducing gears of the enclosed type are fitted it is essential that their lubrication should be given careful attention. The lubrication system may be either splash or pressure circulating, in each of which the oil is subjected to very severe punishment. It is essential, therefore, that the oil selected shall be capable of withstanding the severe operating conditions, and that it be given the same attention, in regard to conditioning, as that suggested for steam turbine lubrication.

In the lubrication of these gears the lubricant has two main functions to perform: First, to provide a cushioning film between the teeth to promote smooth operation; and, second, to act as a cooling medium by absorbing and dissipating generated heat. Generally speaking, light-bodied high-grade oils take full care of gears equipped with a pressure-circulating system; but where splash lubrication is employed a slightly heavier bodied oil is required.

Gas Engines and Steam Engines.

The character of the lubricating oil used on gas engines has an important influence on their efficient operation. A high-grade oil specially suited to gas engine requirements properly applied will reduce frictional losses to the minimum.

Various methods of application of the oil are in use, such as drop oilers, ring oilers (confined to crankshaft and camshaft bearings) and mechanical lubricators, which are operated generally from the camshaft.

A mechanically-operated lubricator is infinitely to be preferred to drop oilers, as uniform positive lubrication is assured for the piston, crank pin, gudgeon pin, and the exhaust valve spindles, and is conducive to greater economy and certainty of action.

Given clean gas and clean operating conditions, a high-grade straight mineral oil will provide the most efficient lubrication.

A steam engine operating at high pressure with the accompanying high temperature requires generally a cylinder oil of heavy body in order to maintain an adequate oil film between the moving parts. Lower steam pressures and temperatures call for proportionately lighter bodied oil, or, if a heavy bodied oil be required to suit other conditions, due consideration must be given to its ability to atomize and distribute readily at the lower temperatures encountered.

The steam pressures in gas-works are generally low, and the conditions wet. Wet steam has a washing effect on the internal working surfaces, tending to wash away the oil film. These conditions call for the use of a suitably compounded oil that will adhere to the surfaces with the requisite tenacity.

Oils of inferior quality cannot cope with these conditions to the same extent as high-grade oils, evidence of which is usually noticeable when the cylinders and valve chests are opened up for inspection. Application of steam cylinder oils through dose cups is both uneconomical and unreliable, owing to the difficulty of control. Hydrostatic lubricators, although an improvement on dose cups, are not altogether satisfactory; it is difficult to maintain a uniform feed, particularly where a closely regulated feed is desired, as the rate of oil feed is affected by variation in temperature and pressure.

In regard to the nature of the oil that should be used in the bearings of steam engines, it will be found generally that straight mineral oils of a body to suit the loads and speeds encountered will care for all ordinary conditions. There are, however, cases where water may be present, in which it is desirable that the oil shall be capable of emulsifying with the water and forming a creamy lather that will not be washed away easily. Such conditions call for the use of a suitably compounded oil, specially selected to meet the requirements. Compounded oils should not be used in enclosed type force feed lubricated engines where water may have access to the lubricating system. For large open type engines having circulating systems free from contamination with water, it is sometimes necessary to use a compounded oil, but this should be done only after full consideration has been given to all the working conditions, preferably on the advice of lubricating specialists.

Storing of Lubricants.

A great deal of waste can also be avoided by taking care that the lubricants are stored in convenient receptacles which will prevent any contamination occurring; and by having a chart of recommendations made out for each set of machines, there is no danger of the wrong grade being used. All containers of lubricants should be kept scrupulously clean, and a record kept of how much lubricant is used in each section of the plant.

HOT WATER AND GAS TARIFFS.

By H. C. Ridley, of Christchurch.

In Christchurch, the annual consumption per meter in 1907 was 25,611 c.ft., and in 1929 it was 18,063 c.ft. This was a very undesirable state of things, and meant that the ratio of overhead charges to the cost of manufacture was increasing, whereas it should decrease. Electrical and oil competition was largely responsible for this. They took the lighting and commenced to raid the heating business.

Admittedly, heating by electricity is not, compared with gas, sound economically. Yet our competitors, the Municipal Electricity Department (M.E.D.) were steadily increasing their heating business. It became apparent that there was only one reason for their success, and that was in their method of charging.

We were mesmerized by our flat-rate system, which, for generation after generation, was quite able to keep our business and maintain a steady stream of new consumers. We did not wake up until our so-easily-earned prosperity was threatened. The position arrived when we were losing good business in the city and gaining unprofitable consumers in the suburbs. A consumer does not become profitable until he consumes 1500 c.ft. of gas monthly. We have 10,000 consumers whose monthly consumption of gas is less than 1000 c.ft. Obviously, then, the consumers over 1500 c.ft. per month are paying for these 10,000 unprofitable consumers. It does not really matter whether we sell more gas to the 10,000 or more gas to the already profitable consumers. What we want is to raise the aver-

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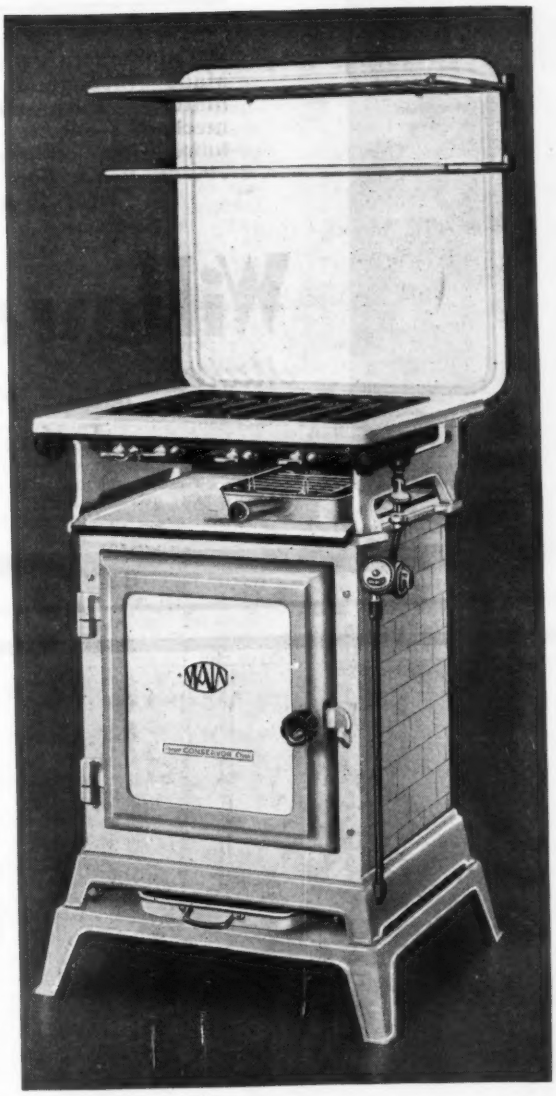

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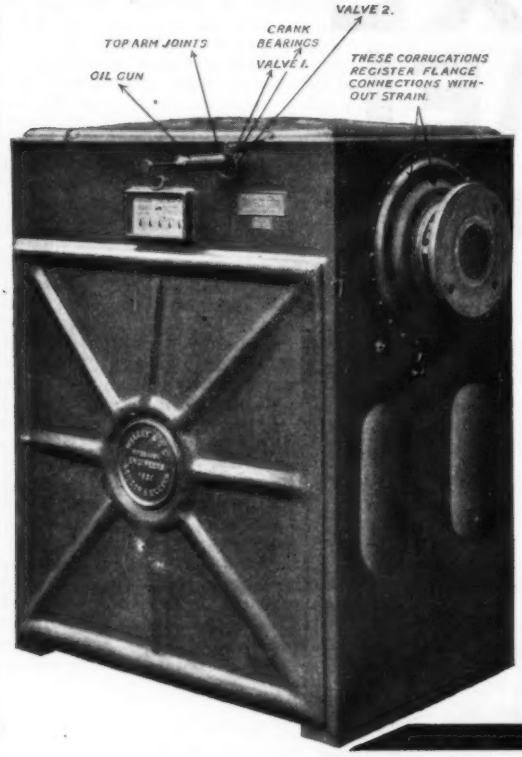

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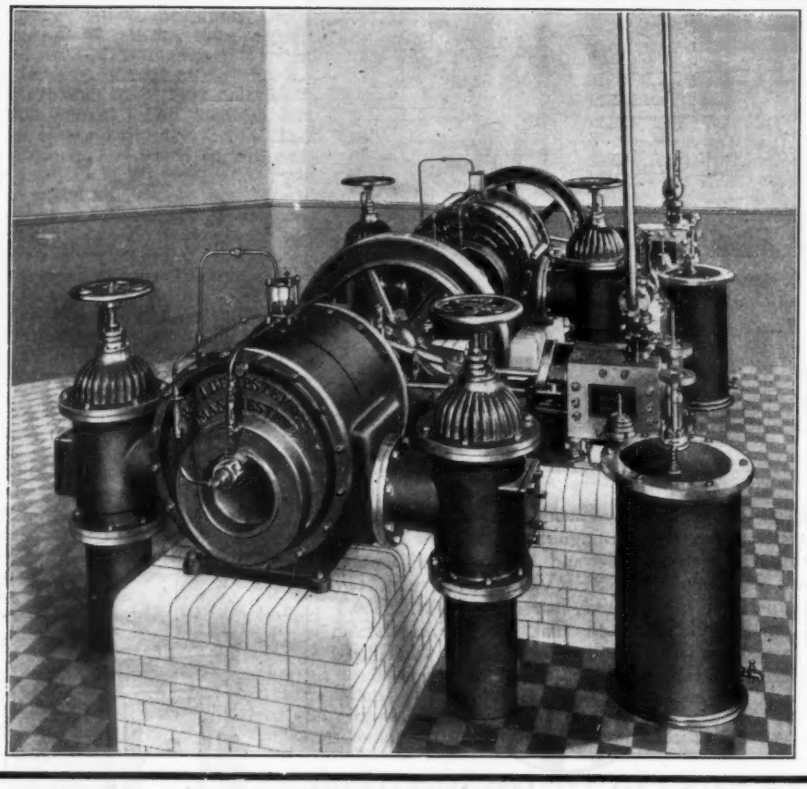

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age consumption per meter, and if we are to maintain our prosperity this must be our object.

We have definitely thrown overboard the flat-rate method of charging for gas. One of the causes of this decision was the number of large heating accounts that had been lost. With a view to preventing further losses, the following rate was sanctioned by the Board of Directors:

> The first 10,000 c.ft. of gas consumed for purely room heating purposes to be charged for at the rate of 7s. 2d. per 1000 c.ft., and all further consumption to be at the rate of 3s. 7d. per 1000 c.ft.

Under this rate, we have retained our heating load and added recently several very valuable accounts, notably the Waltham School, with a consumption of 1000 c.ft. per hour. A manufacturer in Christchurch was using approximately 8,000,000 c.ft. of gas per annum, and contemplated adding a unit that would consume another 2000 c.ft. per hour. The manager was sent abroad to gather information, and came back much impressed with an electrical apparatus made in Germany. We could not afford to lose any revenue; but we wanted this extra consumption. If we charged 3s. 7d. per 1000 c.ft. for all his gas consumption we should have lost £600 per annum. We therefore offered him a rate of 3s. 7d. per 1000 c.ft. for all gas consumed, with an additional Service Charge of £50 per month. In consequence of this, the cost of gas for the new unit will be 3s. 7d. per 1000 c.ft., while the original rate will be maintained for the old consumption. The offer was accepted, and we secured the new business.

A similar offer has been made to, and accepted by, the Christchurch Hospital Board, as we want them to think in terms of 3s. 7d. rather than 6s. per 1000 c.ft. (the rate they now pay by our sliding scale) for all additional gas consumption; and unless political pressure is brought to bear, we should get all the business in their contemplated extensions.

Before we deal with the matter of selling and fixing water heaters, it will be as well to go into the question of costs of gas manufacture and hydro-electricity generation. The cost of the gas at the consumer's meter in Christchurch is, and has been for some time, 5s. 3d. per 1000 c.ft. The cost of gas into holder is 2s. per 1000 c.ft., and includes oxide for purification, wages, materials for repair and maintenance, salaries, endowment insurance, coal (less residuals), and rates.

Hydro-electricity, which costs the M.E.D. 1·3d. overall, is sold, for water heating purposes, as low as ½d. per unit. Householders are charged 1d. per unit for cooking and heating. Under the maximum demand system, the rate for lighting generally works out at under 3d. per unit. These rates enabled the Department to show a balance to credit last year of over £40,000, on which no income-tax is paid.

The reason the Christchurch City Council can sell electricity for water heating and cooking, &c., at such low rates is on account of the valley in their load at night, combined with their profitable lighting business. They restrict the use of current for water heating to the valley period, and as they pay the New Zealand Government on the maximum demand system, any price they get for electricity used during that period is found money. The consequence is that they have been able to place thousands of water heaters at £6 per annum, and we let them do it without any retaliatory effort. Why? Because we were obsessed with the tradition of the flat rate.

The utmost that was done was to strike a sliding scale of charges, which allowed the small reduction of 5d. per 1000 after 10,000 c.ft. of gas had been consumed—an absolutely farcical rebate for gas service in the home.

It was evident, therefore, that 7s. 2d. per 1000 c.ft. was a non-competitive rate, and a cheaper gas was imperative if we were to stay the onward march of electricity, and attain our object of increased consumption per meter.

We could not, however, lower the price of gas for all purposes, as we could not afford to lose revenue, and it was realized that it could only be for additional consumption that the price could be reduced. Here is where the storage water heater fitted in; in fact, it solved a very difficult problem. There were practically no gas storage water heaters in use in Christchurch.

We recommended, and the Board of Directors passed, the following tariff:

> Where a gas storage water heater is installed and consistently used for all household hot water requirements, the gas rate for all purposes shall be 3s. 7d. per 1000 c.ft. In addition, a monthly Service Charge of 5s. must be paid for each and every month.

Now we will consider the financial results of this step. As before stated, our "in-holder" cost is 2s., and the overall cost is 5s. 3d. per 1000 c.ft. Therefore, our overheads are 3s. 3d. per 1000 c.ft. If we can double the consumption in a home, the overheads will be halved, and will only be 1s. 7½d. per 1000 c.ft. If we can treble the consumption, our overheads will only be 1s. 1d. per 1000 c.ft. In the latter case, then, our overall costs will be 3s. 1d., instead of 5s. 3d. On looking through our ledger accounts, I find that 2000 c.ft. of gas per month is a fair average consumption where a cooker only is used. If we can turn a 2000 c.ft. monthly gas account into a 6000 c.ft. account, there will be an additional consumption of 4000 c.ft. per month. As our overheads in this case are divided by three, the overall cost of gas is consequently reduced from 5s. 3d. to 3s. 1d. per 1000 c.ft.

We have found the average rate received for gas in new houses under the "all-gas" tariff is 4s. 5d. This will therefore leave a profit of 1s. 4d. per 1000 c.ft. Under the old tariff, we should have sold 2000 c.ft. at 7s. 2d., with gas costing 5s. 3d., and make a profit of 3s. 10d. Under the new tariff we sell 6000 c.ft., and, as stated above, the profit is shown to be 1s. 4d. per 1000 c.ft. We therefore have now a balance of 8s. against formerly 3s. 10d. We will set these down in figures:

Old Rate.	s.	d.	New Rate.	£	s.	d.
2000 c.ft. at 7s. 2d.	14	4	6000 c.ft. at 3s. 7d.	1	1	6
,, ,, ,, 5s. 3d.	10	6	Service charge	0	5	0
Profit	3	10		£1	6	6
			Cost at 3s. 1d.	0	18	6
			Profit	0	8	0

Taking another method, we arrive at the same result:

Revenue.	£	s.	d.	Cost.	s.	d.
6000 c.ft. at 3s. 7d.	1	1	6	First 2000 c.ft. at 5s. 3d.	10	6
Service charge	0	5	0	Extra 4000 c.ft. at 2s.	8	0
	£1	6	6		18	6
Profit	0	8	0			

I am quite aware that with the increased consumption additional overhead charges will accrue, but the above figures are sufficient to show that the added profit is ample to take care of these, and also to supply interest on the extra capital expenditure that will be required. It must also be remembered that the cost of manufacture will decrease as the output increases.

It will interest members, no doubt, to hear of the result of the optional "all-gas" tariff in Christchurch.

We have to date (November, 1930) some 220 consumers who have installed a storage water heater in their homes, this being necessary under the terms of the tariff. I have a list here of 122 of them, which shows a monthly consumption of 958,200 c.ft. Forty-one of these were new consumers, the balance, eighty-one, consumed originally 273,600 c.ft., or an average of 3400 c.ft. per meter. After the water heaters were installed, the consumption rose to 714,300 c.ft., or an average per meter of 8800 c.ft., showing a water heating load in these particular houses of 5400 c.ft. per month per meter.

It was unfortunate that we experienced the set-backs at the commencement of the campaign—the impression got round that gas water heating was a failure. The faulty appliances have all been taken out, and heaters of later design put in, but bad first impressions take a lot of eradicating.

For the following reasons, I believe gas undertakings must change their methods of charging for gas, particularly for gas used in the home:

> Electricity otherwise will take the heating business from us.
>
> A much greater consumption per meter will be obtained.
>
> The load will be spread over the 24 hours.
>
> Overhead charges will be spread over at least double the consumption.
>
> Capital expenditure per 1,000,000 c.ft. of gas will be less.
>
> Proportionately, there will be less capital spent on trunk mains.
>
> The extension of your competitor's business will be retarded, making it more difficult for him to reduce prices.
>
> An "all-gas" service may be offered to consumers at a cost they can afford.

There is no doubt that the people of Christchurch are thinking electrically. First, our competitors attacked successfully the lighting business, and then, with the very low rate of ½d. per unit, they placed thousands of water heaters. What is the result? A person building a house naturally concludes that if electricity can provide cheap water heating and lighting, it follows that cooking can also be economically done by the same means, and the belief is fostered that the day of gas is over.

Once this impression gets hold of the minds of the people, it will cost a lot of money and energy to combat it.

Electricity for cooking, water heating, or heating gener-

ally cannot give the service to the householder that gas can; and this being so, it is our fault if we let the business go for the want of a little courage and faith.

PURIFICATION OF COAL GAS.

By C. SINGLETON, of Melbourne, Australia.

The removal of sulphuretted hydrogen is now practically universally effected by means of iron oxide, contained in a series consisting of two, three, four, or more purifier boxes. The valves and connections for controlling the flow of gas are arranged so that any single box can be isolated for the removal and renewal of the oxide without interfering with the working of the remainder of the series.

A series of four boxes is often provided with a valve, which allows for working in rotation any three on and one box off, or in the case of a Wecks eight-way centre valve, all or any number can be worked. With four purifiers worked "all on," I personally prefer to have a separate catchbox, or even two, to cover the periods when changing a purifier, as it sometimes happens that two or even three out of the set of four purifiers may contain material which is equally spent.

The oxide of iron is alternately subjected to fouling by the gas and revivification in the atmosphere when the combined sulphur is converted into a free state, and the material rendered suitable for re-use until finally spent and containing from 50-60 p.ct. of sulphur. After the first working, the sulphur content will usually be 35-40 p.ct. on the dry basis. The old rule for purifier capacity was ½ sq. ft. of area for each purifier per 1000 c.ft. of maximum daily make, assuming a set of four purifiers to be intended, while the velocity of the gas through the oxide should not exceed about 1·4 ft. per minute.

The amount of H_2S in the gas may vary between wide limits and depends entirely upon the sulphur content of the coal (which may vary from 0·5 to 5 p.ct. or even more), and the make of gas per ton of coal. Average conditions with about 2 p.ct. of sulphur in the coal gives about 600-700 grains of H_2S per 100 c.ft. at the inlet to the purifiers.

In normal circumstances, the gas leaving the wet purification plant is saturated with water vapour at its own temperature. In addition to the water present in the gas (which, under certain temperature conditions, may be condensed in the purifiers), there is also the water originally present in the oxide and the water from the sulphiding action.

TEMPERATURE AT INLET.

For proper working, the temperature of the gas at the inlet to the purifiers should not be less than 75° Fahr. Due to the difficulty in controlling this (particularly where the purifiers are in an exposed position, or in the open), the gas is in some instances passed through a tubular heater supplied with exhaust steam in order to raise the temperature sufficiently to maintain the purifiers in active work. In other cases, considerable benefit has been derived from an open steam supply (controlled by a suitable steam valve and nozzle with pressure gauge) injecting steam into the gas main at the inlet to the purifiers. This not only raises the temperature, but, where the moisture tends to "dry out" of the oxide, and create back pressure (due to the outlet temperature of the gas from the purifiers being higher than the inlet), replaces the moisture which has been removed, and maintains the oxide in the correct condition for effective working.

The moisture content depends to a certain extent on the type of oxide in use, but generally 20-25 p.ct. appears to give the highest activity. Interesting particulars on this point are to be found in a report by W. A. Dunkley and R. D. Leitch to the U.S.A. Bureau of Mines in 1924.

For continuous satisfactory working and control of purifiers, it is necessary that systematic testing and recording of the working of the boxes should be carried out, together with a "life" record of each batch of oxide in use. In addition to the usual lead acetate paper test on each box (say) twice per day, it is useful to record the quantity of H_2S in grains per 100 c.ft. passing each box daily. Thermometers should also be fitted with the stems inserted into the oxide, or preferably in the gas stream between box and box. By systematically recording the temperatures each hour at the main inlet and the outlet of each box (particularly where the boxes are working on a daily backward rotation system), together with the tests previously mentioned, a sound guide as to the activity and working of the boxes can be secured.

Most oxides show the greatest activity at a temperature of 100°-120° Fahr., but safe working temperatures should be determined for each installation as these vary with the sulphur content and oxygen in the gas.

Typical temperatures, measured in the gas stream, and normal working tests on this installation were:

—	° Fahr.	Grains H_2S per 100 C.ft.
Main inlet	71	600
Inlet, 1st box	71	—
,, 2nd ,,	82	410
,, 3rd ,,	82	10
,, 4th ,,	74	Clean
Main outlet	74	Clean

With a set of four purifiers working on the backward rotation system, and rotated when the third box shows a faint trace, care must be taken to avoid having all four boxes filled with oxide fouled to approximately the same extent. If it takes four changes for an oxide to become completely fouled (it is advisable with this system to have two boxes working on their first and second fouling respectively to avoid the possibility of several boxes ceasing to function at the same time.

With the backward system of rotation, the last or clean box, when the rotation is changed, is brought to the front, viz.:

1, 2, 3, 4.
4, 1, 2, 3.
3, 4, 1, 2, &c.

Normally, coal gas contains about 0·5 p.ct. O_2, which is nearly sufficient (with adequate purifying area) to secure a good revivifying action. It is, however, found in practice that additional air must be admitted, and with a uniform exhauster pull this can be satisfactorily done by means of a series of small plugs or cocks on the inlet side of the exhauster. There are certain objections to this method, and a better arrangement is to force the air by means of a small rotary compressor into the gas stream just prior to the purifiers, and control the quantity by regular tests on the gas for O_2, and varying the speed of the blower, which is generally equipped with a revolution counter. Another method is to draw the air required through a suitable sized meter.

When purchasing oxide it is desirable to do so on a definite moisture basis, as this varies considerably in different samples. The value of an oxide for purification purposes is generally judged by its content of ferric oxide, but this is not an absolute guide to its activity, and it would appear that the physical condition of the oxide is equally important.

Institution of Gas Engineers.

Communication on Dr. Lessing's Paper.

Mr. WILLIAM GREEN writes: I have read with much interest your paper before the Institution of Gas Engineers, and the subsequent discussion thereon. As a result of this I would suggest one point to which no special reference was made either in the paper or in the discussion—*i.e.*, the elimination of sulphur compounds—which, I think, merits consideration.

I presume that the mineral sulphur impurities in the coal are removed by your process except in cases where such are finely disseminated in the coal substance; thus in a normal coal it should be possible practically to eliminate mineral sulphur impurities, leaving only organic sulphur compounds present in the coal. According to Powell (U.S.A.), organic sulphur compounds present in the coal are not removed during the process of carbonization, and therefore remain in the resultant coke. It would be admissible in these circumstances to suggest that if a coal be obtained practically free from mineral sulphur impurities the gaseous and liquid bye-products should contain a minimum of sulphur compounds. The advantages I foresee from such a clean coal for carbonization are:

(1) Clean coke containing a minimum of sulphur and more suitable for domestic, metallurgical, and other industrial uses.

(2) Minimum sulphur compounds in the ammonia liquor during carbonization, with a consequent saving in the amount of lime used. waste liquor produced, and less effluent for disposal.

(3) Less sulphur impurities in the crude benzole resulting in somewhat lower rectification costs; this point would be more important if the benzole was to be prepared for motor spirit by the inhibition process.

(4) Reduced sulphur compounds in the gas, with consequent reduction in purification costs (of particular interest to the Gas Industry).

REGISTER OF PATENTS

Gas Burners for Wash-Boilers.—No. 347,475.

UTTLEY INGHAM & CO., LTD., and GREENWOOD, J., both of Hebden Bridge.

No. 12,344; April 22, 1930.

The novelty of this invention consists in the production of a pressed and seamless sheet metal gas chamber with sheet metal or other tube attached thereto and used in lieu of a cast-metal structure, there being used in connection with the seamless sheet metal gas chamber a cast-iron cover which sits on the seamless chamber and is secured thereto. Further the sheet metal or other tube is fixed to the seamless chamber and flattened at its outer end where the gas injector nipple is secured, to prevent the air adjuster disc from being screwed past the gas injector nipple and so becoming detached.

Thermo-Control of Heat Interchangers. No. 350,190.

COOPER, C., HENSHAW, D. M., and W. C. HOLMES & CO., LTD., all of Huddersfield.

No. 14,596; May 12, 1930.

It is common practice with gas coolers to provide an automatic thermo-regulator adjacent to the outlet of the gas to be cooled, to govern the supply of cooling means or otherwise to control the cooling or heating effect. Where, however, the path or time of travel of the gas to be cooled is long, and particularly where there are wide fluctuations in the inlet temperature or other factors, it is frequently not possible to obtain a suitably uniform result owing to the time lag. Such conditions may arise in gas coolers forming part of a water gas plant. Where a thermo-regulator is placed at the outlet of the cooler for effecting control, the variations in load are of such character that it is difficult to deal with the variations satisfactorily.

According to the present invention a plurality of thermo-regulators, adapted to control the supply of cooling medium, are associated with a heat exchanger at different points in the path of travel of the gas to be cooled. In this way, before the effects of the increase in load on the heat exchanger are reached at the outlet for the gas to be cooled, the rate of the supply of cooling medium to the portion of the apparatus remote from the outlet would be increased, with the result that the effect of the variation in load would be in part compensated for before the fluid reached the outlet. The relation between the normal or maximum rate of supply of the cooling medium in accordance with the variation in temperature to which the several thermo-regulators are subjected may be calculated from known data or the results of experiments, and the control by each of the thermo-regulators may be independent one of the other. In a particular case it may be convenient to provide in the heat exchanger two thermo-regulators, one adjacent to the point of outlet of the fluid to be cooled, and the other, for instance, halfway between the inlet for the fluid and the outlet therefor; and in such case, for instance, supposing that the fluctuation in load at the inlet was represented by variations from zero to 100, the first thermo-regulator may be adjusted to the load equivalent to one-half of the total fluctuation, the load with which the second thermo-regulator is called upon to deal being correspondingly reduced.

Carburetted Water Gas Manufacture. No. 350,866.

HUMPHREYS & GLASGOW, LTD., of Westminster (Assignees of PERRY, J. A., of Swarthmore, Pennsylvania).

No. 31,394; Oct. 20, 1930. Convention date, Nov. 20, 1929.

The following claims are made for this invention:

1. A process of making carburetted water gas wherein an ignited fuel bed is maintained by appropriate upwardly air blasting through the entire depth of the fuel bed. The resultant blast gases are led off from the top thereof and burned with air, and their heat is stored in a chamber or chambers, blue water gas is generated by steaming the ignited fuel bed, and the blue water gas is carburetted by high coke oil introduced to the top of the fuel bed, and by low coke oil introduced to the heat storage chamber or chambers.

2. A process of making carburetted water gas according to claim 1, wherein generation of blue gas is effected by an uprun with steam through the fuel bed, during part of which uprun high coke oil is introduced to the top of the fuel bed, and during another part of which low coke oil is introduced to the heat storage chamber or chambers.

3. A process according to claim 1 or claim 2 wherein a downrun is effected with steam passed backwardly through the set as a whole, the resulting gas being led off to storage.

4. A process according to claim 1, claim 2, or claim 3, wherein high coke oil is introduced to the top of the fuel bed at a diminishing rate, and low coke oil simultaneously introduced to the heat storage chamber or chambers at an increasing rate.

Geysers.—No. 350,211.

EWART, S., and EWART & SON, LTD., both of Euston Road, N.W. 1.

No. 16,072; May 24, 1930.

A geyser is provided wherein the gas burner and a gas control tap are independently and detachably secured to a member carried by the shell of the geyser. The base portion of the geyser is provided with a gas ring burner, the inlet of which is formed with a spigot to engage a supporting ring secured to the side or wall of the base. The gas ring is connected to the supporting ring by a pair of screws arranged to extend through the supporting ring from the exterior of the base and engage a flange provided on the gas ring. The supporting ring is provided with a recess for the reception of the inlet spigot of the gas ring, a washer being interposed in order that a gas-tight joint may be effected. The outer face of the supporting ring is provided with a recess arranged to engage a spigot provided on the gas control tap, the flange of which is connected to the ring by a pair of screws, so as to secure the gas control tap firmly in position independently of the gas ring, a washer being interposed between the end of the spigot and the recess. The base is provided with a pair of oppositely disposed doors, so that when the geyser is fitted in position the door adjacent the wall of a room may be permanently fixed while the other may be used for fitting purposes.

Meters.—No. 350,609.

THOMAS GLOVER & CO., LTD., and MCINTOSH, W. B., both of Edmonton, N. 18.

No. 9350; March 24, 1930.

The object of this invention is to construct the grids over which the valves work, and their parts for connection to the bellows chamber and the bellows, each as one unit securable to a hole cut in the horizontal dividing wall of a gas meter, and to connect up the exhaust ports by a channel to the outlet pipe.

Each grid is constructed with three oblong openings, and on the underside of each grid, and projecting through the horizontal division wall of the meter, is provided a capping for a portion of each opening in the grid, each capping consisting of a box-like structure extending from the underside of the grid bars and provided with one end closed and chamfered, the other end being open. These cappings are open to the grid and are positioned so that the two on the outside look in a different direction to the centre one, and the open end portion of the centre one overlaps the ends of the outer ones, the ends of all cappings being on the edge of the grid.

Fluid Pressure Governors—No. 352,117.

GAS LIGHT AND COKE COMPANY, CLARK, J. G., MASTERMAN, C. A., and PINKESS, L. H., all of Westminster, S.W. 1.

No. 11,960; April 15, 1930.

This invention has for its object to provide an improved construction and arrangement of parts of a fluid pressure governor of the loaded diaphragm type so as to facilitate access to all parts of the governor for cleaning, renewal, or other purposes.

The valve seat through which the fluid flows is formed as a separate and removable part of the governor. To prevent leakage between the valve seat and the governor casing, the valve seat may be forcibly retained in position against the governor casing by means of grub screws, or it may be of such a weight in excess of any inlet pressure which may be expected that it is retained on its seat in the governor casing by the excess weight. The grub screws, if used, can be manipulated from outside the governor. Superposed above the separate and removable valve seat is a diaphragm which is clamped between the governor casing and an annulus screwed into the upper end of the governor casing, the annulus having a small central bore covered by a perforated plug screwed into the outer face of the annulus so that the space above the diaphragm is constantly open to the atmosphere.

The valve is carried by the lower diaphragm clamping block, into which it may be screwed, and is provided with an enlarged

portion which at very low pressures might fall sufficiently far to constrict the opening through which the fluid passes from the inlet to the outlet of the governor. To prevent this, the separate and removable valve seat may be provided with upwardly extending lugs or adjustable and removable studs positioned on the valve seat around the hole therethrough, the lugs or adjustable studs being of such a height as to prevent closure or constriction of the opening in the valve seat by an enlarged portion on the valve stem. The enlarged portion of the valve is disposed between the valve proper and the screw threaded end of the stem, and seats itself in a recess in the lower diaphragm clamping block.

The pneumatic brake arrangement formed by the perforated annulus screwed into the upper end of the governor casing prevents rattle of the parts when only a small amount of fluid is passing or being drawn through the governor, and also prevents or retards wear and improper governing. The upper end of the central bore in the annulus terminates in a small platform which is surrounded by a recess so that any dirt passing through the plug or closing tap settles in the recess, and consequently cannot interfere with the proper action of the governor. The pneumatic brake arrangement also facilitates oiling and prevents stoppage of the governor by dirt.

Gas Fire Radiants—No. 351,466.

LUCKHURST, T. W., of Weston-super-Mare.

No. 9397; March 24, 1930.

The invention relates to radiants for gas fires treated with compounds of the rare earth metals—such, for instance, as thorium and cerium—adapted to modify the character of the radiation thereof when heated. Compounds of rare earth metals may be incorporated in the substance of the radiant or may be applied to the surface or certain portions of the surface, and particularly such surfaces as are subjected to the direct action of the flame of the heating medium.

The compounds are employed in association with materials adapted to promote in securing adhesion thereof to the surface of the radiants; and for this purpose materials of a cementitious character may be used—for instance, cements of the gypsum type. Alternatively, other inorganic cementitious material may be used for the purpose—such, for instance, as magnesium oxy-chloride or zinc oxy-chloride cements.

By the invention, types of fuel or radiants for gas heaters of various kinds—for instance, mantles for portable bowl-type reflectors or other types of portable gas heaters, as well as for the more usual gas fire—may be produced.

Automatic Gas Valves for Geysers – No. 351,871.

BARRALET, J. H., and NEW GEYSERS, LTD., both of Addington Square, S.E. 5.

No. 32,222; Oct. 27, 1930.

This invention relates to valves which are moved into the open position by the action of the water flowing into the geyser, and more particularly to those constructions in which a cup carried on one arm of a lever is arranged in the water inlet in the path of the inflowing water, and retains a sufficient weight of water to depress the cup and actuate the the lever to raise the valve into the open position. So long as the inflow of water is maintained, the valve remains open, but should the flow of water cease the cup is arranged to empty and permit the valve to gravitate into the closed position to shut off the gas. Valves of this kind are usually operated through a long rod or stem enclosed in an outer tube in which other tubes are arranged to form a water seal to which water has been admitted heretofore from the water chamber of the geyser, or through some other direct connection to the geyser.

According to the invention, the automatic valve with its casing and the water inlet funnel are constructed as an easily attachable or detachable independent unit, provision being made for supplying sealing water to the valve without passing the water through the geyser, so that the only connection of the unit with the geyser is to the burner and gas supply pipe at the lower end and with the water inlet funnel, which is adapted to be inserted in an opening in the top of the geyser and held against turning therein.

Legal Intelligence

A Question of Subsidence.

Gas Company's Action Dismissed.

In the Chancery Division, on Wednesday, July 29, Mr. Justice Farwell concluded the hearing of the action by the Westhoughton Consumers' Gas Company against the Hulton Colliery Company, Ltd., in which damages were claimed for alleged wrongful taking away of the support of the Gas Company's premises, buildings, and works at Westhoughton.

Mr. Jenkins, K.C. (for plaintiffs), explained that they carried on the business of making and supplying gas, and the defendants were a colliery and mining Company which held leases of land round about the Gas Company's works. The Gas Company claimed that their works had been seriously damaged by the mining operations of the Colliery Company. A question would

be raised under the Statute of Limitations, because the working of the colliery, so far as was relevant in this case, came to an end about 1913. Counsel thought the Colliery Company would not be able to dispute that the gas-works suffered seriously from something, but they denied that the damage was brought about by any workings of theirs.

Mr. Archer, K.C. (for the defendants), said his clients were of opinion that their works had caused no damage at all.

Mr. Jenkins said his case was that not only had subsidence occurred, but it was actually going on. The mining property was intersected with a number of forks, and the result was that the strata were very much disrupted. A part of the strata, Counsel said, consisted of very strong rock, which took some time to fracture, and there was nothing unusual in a subsidence taking place 18 years afterwards. He asked the Court to find that the damage was caused by reason of the work carried out by the defendants.

A mass of technical evidence was called on both sides.

His Lordship dismissed the action, with costs, holding that there was not sufficient evidence to enable him to find that the deplorable condition of the plaintiffs' buildings was caused by the mining operations of the Colliery Company, and not by the inherent weakness and instability of the buildings themselves.

Municipal Gas Undertakings' Results in 1930-31

DUNFERMLINE.

The total income amounted to £74,211 and the expenditure to £52,793, leaving a gross profit of £21,418. To this sum is added unemployment relief grants, £807, making a total credit of £22,226. From this sum there falls to be deducted £20,734, leaving a surplus of £1492. This sum has been deducted from the debit balance brought in, leaving £957 to be carried forward against the current year. The quantity of coal carbonized during the year amounted to 20,377 tons, and the average price was 18s. 2·4d. per ton delivered. The quantity of gas made as per station meter amounted to 366,616,000 c.ft.—an increase of 4,387,000 c.ft., equal to 1·21 p.ct. The average yield of gas per ton of coal was 17,991 c.ft. as per station meter, or 18,238 c.ft. corrected, of an average calorific value of 431·1 B.Th.U., equal to a production of 78·62 therms per ton. The net income from residual products amounted to £10,241, equal to 10s. 0·6d. per ton of coal carbonized, or 55·05 p.ct. of the cost, making the net cost of coal 8s. 1·8d. per ton.

KENDAL.

At the Council meeting of the Borough of Kendal, Mr. Thomas Crowdy, Gas and Water Engineer and Manager of the Gas and Water Departments, was congratulated on the financial results of the two Departments. The gross profit on gas amounts to £7785. After providing for interest and sinking fund, bank charges, and income-tax there is a net profit of £1879. The quantity of gas made was 557,451 therms, against 584,706 therms last year, being a decrease of 27,255 therms. The quantity of gas sent out, including public lighting, was 513,131 therms, against 496,816 therms last year, being an increase of 16,315 therms. It will be observed that less gas has been made and more sold. This can be accounted for to some extent by the large number of heavy leakages which have been stopped in mains and services; 909 joints have been caulked up on the Burneside-Stavely line alone. There is an increase of 89 in the number of consumers, the total being 5068, made up of 2120 ordinary and 2948 prepayment meters. The income from gas shows an increase of £870. During the year the make of gas per ton of coal carbonized was increased by 1·36 therms, the present yield being the highest in the history of the Undertaking.

LANCASTER.

At the meeting of the Lancaster Town Council, on July 29, Councillor Till (Chairman of the Gas Committee) said the report of the Engineer (Mr. G. Dixon) which would shortly be distributed was most satisfactory. The net profit was £9783, against £9117 last year. They gave £1000 to the rates; £1306 was spent in gas main extensions; and they had carried forward £7477, making their reserve fund £31,000. They had spent £12,000 on new plant and works. The sale of gas had increased by £287, in spite of the reduced price. Residuals had brought in £346 more. The new system of retorts was a bold step, but the Engineer and the Committee were absolutely satisfied. The results were up to expectations and satisfactory. Experience was giving them better results than they obtained at first.

LLANDUDNO.

The Gas Committee report a deficiency of £1530 on the Gas Undertaking for the year, and propose that it be met out of the reserve fund. Councillor W. Thomas, the Chairman of the Committee, said they had been passing through very difficult times, during which Llandudno especially had been badly hit by trade depression. During this period, however, the Committee had been obliged to spend large sums of money on the gas concern. There was, he said, a great future for gas in Llandudno if they could get a little sympathy and encouragement from the Council towards the Gas Committee.

You are aware of the disastrously bad effect upon the Gas Industry which an old type, pressure absorbing meter has upon apparatus.

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GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

As foreshadowed in the Report last week, a further increase was made in the Bank Rate on Thursday last of 1 p.ct. to 4½ p.ct.; and while this had the immediate effect of lifting the principal exchanges to a better level, it also brought in its train a general lowering of prices in the gilt-edged market. Business on the Stock Exchange was quiet throughout the week, and it is only to be expected that until the financial atmosphere has cleared commitments will be considerably restricted.

Business in the Gas section was about normal, and, with few exceptions, prices remained unchanged. A big drop of 15 points occurred in Imperial Continental ordinary stock; and on the basis of a 20 p.ct. distribution, the yield at the average price works out at £6 9s. A year ago this stock stood at 355-375, and at one time during the year changed hands at 418, so that with some improvement in the financial outlook much of this lost ground should be recovered. Two important debentures were marked down 2 points—viz., Gas Light 3 p.ct. and South Metropolitan 3 p.ct.—and this can be attributed mainly to the rise in the Bank Rate. On the other hand, Bristol 5 p.ct. (at the local Exchange) quickly recovered the 1½ points *ex* div. reduction of a week ago, and fractional improvements were made by Bournemouth "B" £10 shares and Malta and Mediterranean £5 shares.

Among last week's ordinary dividend announcements for the past half-year it is gratifying to note that the Directors of the Tottenham and District Company have declared an increased distribution of £3 7s. 6d. p.ct., against £3 6s. 3d. p.ct. for the corresponding period. This Company's business has been progressing rapidly for some years past, and by absorption has largely increased its area of supply. Moreover, a Special Order has been applied for to add to this still further by the transfer to the Company of the Hertford and District, Hoddesdon, and Ware Gas Companies. Thus there is wide scope for future developments, and intending investors will be fortunate to secure a holding within a point or two of the present average price of 105.

An interim dividend of 4 p.ct. has been declared by the Maidstone Company, which compares with a final dividend of 4½ p.ct. for the corresponding period 1930. The Company's financial year now ends at Dec. 31 instead of June 30, and the Directors hope to maintain the dividend at 8½ p.ct. per annum as hitherto. Other interim dividend announcements last week were: Chester, 2½ p.ct.; Bournemouth, 4½ p.ct. on the original shares and 3½ p.ct. on the maximum shares; and South Suburban 3¼ p.ct. These are all at the same rates as a year ago.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 1.

The prices for tar products to-day are as follows:

Pitch is firm at 52s. 6d. per ton, f.o.b.

Creosote, for export, varies from 3¾d. to 5d. per gallon, f.o.b., according to specification.

Pure toluole is 1s. 10d. to 1s. 11d. per gallon; pure benzole, about 1s. 4d. per gallon; and 95/160 solvent naphtha, about 1s. 4d. per gallon, in bulk *ex* sellers' works.

Pyridine bases, 3s. to 3s. 3d. per gallon.

Tar Products in the Provinces.

Aug. 3.

The average prices of gas-works products during the week were: Gas-works tar, 20s. 6d. to 24s. 6d. Pitch—East Coast, 52s. 6d. to 53s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 52s. 6d. to 53s. 6d. f.o.b.* Toluole, naked, North, 1s. 6¼d. to 1s. 6¾d. Coal-tar crude naphtha, in bulk, North, 5d. to 5¼d. Solvent naphtha, naked, North, 1s. 1¾d. to 1s. 2d. Heavy naphtha, North, 10½d. to 11d. Creosote, in bulk, North, liquid and salty, 3¼d. to 3½d.; low gravity, 1¼d.; Scotland, 3¼d. to 3½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid, 60's, 1s. 3d. to 1s. 4d. Naphthalene, £9 to £10. Salts, 50s. to 70s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Aug.* 1.

Distillers have been busier during the week fulfilling the accumulation of orders received during the holidays. Most products are in plentiful supply, however, so that prices remain without much alteration.

Pitch.—Quotations are in the region of 40s. per ton for prompt and 42s. 6d. to 45s. per ton f.o.b. Glasgow for forward. Home trade is quiet at about 37s. 6d. per ton f.o.r. works.

Refined tar to Ministry of Transport specification is in steady demand at 2½d. to 2¾d. per gallon *ex* makers' works in buyers' packages.

Creosote oil.—Trading is somewhat erratic, but prices remain steady. B.E.S.A. Specification is 2¾d. to 3d. per gallon; low gravity, 3¼d. to 3¾d. per gallon; and neutral oil, 3¼d. to 3½d. per gallon; all f.o.r. works.

Cresylic.—Market remains dull and uninteresting. Pale, 97/99 p.ct., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 p.ct., 1s. 2d. to 1s. 3d. per gallon; and pale, 99/100 p.ct., 1s. 5d. to 1s. 6d. per gallon; all *ex* works.

Crude naphtha.—Available supplies being limited, value is steady at 4¼d. to 4¾d. per gallon.

Solvent naphtha.—Few orders are being received. 90/160 is 1s. 2d. to 1s. 3d. per gallon, and 90/190, 11d. to 1s. per gallon.

Motor benzole.—There is no change to report, business being quiet. Value is 1s. 2d. to 1s. 3d. per gallon f.o.r. in bulk.

Pyridines are easier. 90/160 grade is 2s. 9d. to 3s. per gallon, and 90/140 grade, 3s. to 3s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole:

	s. d.		s. d.	
Crude benzole	0 5½	to	0 6½	per gallon at works
Motor ,, ...	1 0	,,	1 1	,, ,, ,,
Pure ,, ...	1 4	,,	1 5	,, ,, ,,

Contracts Advertised To-Day.

Coal.

Tenders are invited by the Sidmouth Gas Department for the supply of gas coal. [See advert. on p. 334.]

General Stores.

The Bradford Gas Committee invite tenders for general stores. [Advert. on p. 334.]

Oils, Greases, &c.

Tenders are invited by the Bradford Gas Committee for oils, greases, &c. [Advert. on p. 334].

Pipes.

The Bradford Gas Committee invite tenders for pipes and castings. [Advert. on p. 334.]

Metropolitan Gas Companies' Testings.

The Gas Referees' report of the official testings for the past quarter gives the following average calorific values for the gas supplied by the Metropolitan Companies named.

Commercial Gas Company.—501·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

Gas Light and Coke Company.—503·1 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—562 B.Th.U. (declared calorific value, 560 B.Th.U.).

Tottenham and District Gas Company.—501 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—472·1 B.Th.U. (declared calorific value, 470 B.Th.U.).

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. July 31.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C. ...	78—83	...	...
522,992	„	„	4	4	Do. 4 p.c. Pref. ...	75—80	...	...
1,551,868	„	Apl. 9	7⅜	7⅜	Alliance & Dublin Ord. ...	102—107	...	105¼
374,000	„	July 9	4	4	Do. 4 p.c. Deb. ...	71—76	...	...
522,655	„	Mar. 5	7	7	Barnet Ord. 7 p.c.	124—129	...	...
300,000	1	Apl. 23	1/4½	1/9½	Bombay, Ltd.	16/6—18/6	...	16/6
174,500	10	Mar. 5	9	9	Bournemouth 5 p.c. ...	15—16	...	15⅝—15⅞
500,050	10	„	7	7	Do. B 7 p.c. ...	12½—13¼	+⅛	12⅞
439,160	10	„	6	6	Do. Pref. 6 p.c. ...	11½—11¾	...	...
50,000	Stk.	June 25	3	3	Do. 3 p.c. Deb. ...	60—63	...	61½—63
162,025	„	„	4	4	Do. 4 p.c. Deb. ...	80—83	...	...
357,900	„	Mar. 19	7½	7½	Brighton & Hove 6 p.c. Con.	112—117	...	115—116
371,880	„	„	6½	6½	Do. 5 p.c. Con.	105—108	...	107—107½
1,287,500	„	July 23	5	5	Bristol 5 p.c. max.	96—97a*	+1½	...
120,420	„	June 25	4	4	Do. 1st 4 p.c. Deb. ...	78—80a*	...	...
217,870	„	„	4	4	Do. 2nd 4 p.c. Deb. ...	78—80a	...	...
326,790	„	„	5	5	Do. 5 p.c. Deb.	98—99a	...	...
855,000	„	Apl. 9	7	8	British Ord.	110—115	...	...
100,000	„	June 25	7	7	Do. 7 p.c. Pref.	110—115	...	...
120,000	„	„	4	4	Do. 4 p.c. Red. Deb. ...	77—80	...	...
450,000	„	„	5	5	Do. 5 p.c. Red. Deb. ...	97—100	...	...
160,000	„	June 25	5	5	Cambridge 5 p.c. Deb. ...	98—101	...	...
109,000	10	May 21	6	8	Cape Town, Ltd.	9—10	...	...
100,000	10	May 7	4½	4½	Do. 4½ p.c. Pref. ...	6⅜—7½	...	...
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb. ...	72—77	...	74½
626,860	„	July 23	6	6	Cardiff Con. Ord.	95—98*	...	...
157,150	„	Feb. 19	5	6¼	Chester 5 p.c. Ord.	85—90b	...	...
98,936	1	May 7	†2/-	†2/-	Colombo, Ltd. Ord....	28/—33/-	...	...
24,500	1	„	1/4⅜	1/4⅜	Do. 7 p.c. Pref.	17/6—19/6	...	...
609,204	1	Apl. 9	1/4½	15·27d	Colonial Gas Assn. Ltd. Ord.	16/—18/-	...	...
296,053	1	„	1/7½	17·67d	Do. 8 p.c. Pref.	17/6—19/6	...	...
2,073,280	Stk.	July 23	6	6	Commercial Ord.	92—95*	...	93⅜—93½
475,000	„	June 11	3	3	Do. 3 p.c. Deb. ...	59—62	...	...
787,560	„	Feb. 19	7	7	Croydon sliding scale ...	110—113	...	110½—112½
453,100	„	„	5	5	Do. max. div.	83—86	...	...
542,270	„	Mar. 5	7	10	Derby Con.	122—125c	...	...
55,000	„	June 25	4	4	Do. Deb.	65—70c	...	...
209,000	„	Mar. 5	5	5	East Hull Ord. 5 p.c. ...	72—75	...	...
1,002,180	„	Mar. 19	†4	†6½	European, Ltd.	80—90	−2	80½—82
18,953,033	„	July 23	5⅜	5½	Gas Light & Coke 4 p.c. Ord.	18/6—19/6f*	...	18/9—19/3
2,600,000	„	„	3½	3½	Do. 3½ p.c. max.	65—68*	...	66—67½
4,294,691	„	„	4	4	Do. 4 p.c. Con. Pref. ...	78—81*	...	79—80
5,694,095	„	June 11	3	3	Do. 3 p.c. Con. Deb. ...	62—65	−2	...
3,642,770	„	„	5	5	Do. 5 p.c. Red. Deb. ...	102—105	...	104—104½
2,500,000	„	„	—	—	Do. 4½ p.c. Red. Deb. ...	97—100	...	97½—99½
161,480	„	Mar. 5	10	10	Harrogate Cons. 10 p.c. max.	157—162	...	...
82,500	„	Mar. 19	7	7	Hastings & St. L. 5 p.c. Conv.	98—103	...	...
258,740	„	„	5½	5½	Do. 3½ p.c. Conv.	82—85	...	83—83¾
70,000	10	Oct. 9	§	10	Hongkong & China, Ltd. ...	13—14	...	...
213,200	Stk.	Mar. 5	6	6	Hornsey Con. 3½ p.c. ...	91—94	...	...
2,800,000	„	May 21	15	25	Imperial Continental Cap.	300—320	−15	300—320
223,130	„	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	78—83	...	...
235,242	„	Mar. 5	8½	8½	Lea Bridge 5 p.c. Ord. ...	127—130	...	...
2,145,907	„	Feb. 19	6	6	Liverpool 5 p.c. Ord. ...	99—100b	−¼	...
306,083	„	July 15	4	4	Do. 4 p.c. Deb. ...	79—81b	...	...
165,786	„	Feb. 19	9	9	Maidstone 5 p.c. Cap. ...	130—135	...	...
63,480	„	June 25	3	3	Do. 3 p.c. Deb. ...	57—60	...	...
75,000	5	June 11	†10	†10	Malta & Mediterranean ...	6½—7½	+¼	7 1/16—7⅛
392,000	—	Apl. 2	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	80—85	...	82½—83
675,000	Stk.	May 21	†6	†6	Montevideo, Ltd.	80—90	...	...
2,061,315	„	Mar. 5	5	5½	Newcastle & Gateshead Con.	17/—17/9d/f	−/3	...
682,856	„	„	4	4	Do. 4 p.c. Pref. ...	75½—76½d	...	...
691,705	„	Jan. 8	3½	3½	Do. 3½ p.c. Deb. ...	69—71d	...	...
277,285	„	May 7	5	5	Do. 5 p.c. Red. Deb.	98—100d	...	...
199,940	„	Mar. 5	7½	7½	North Middlesex 6 p.c. Con.	115—120	...	...
396,160	„	Feb. 5	5	5	Northampton 5 p.c. max. ...	74—79	...	...
300,000	„	Apl. 23	9	7	Oriental, Ltd.	98—103	...	95
60,000	5	13 May, '15	—	—	Ottoman	0—½	...	...
205,162	Stk.	June 25	8	8	Plym'th & Stonehouse 5 p.c.	110—115	...	...
424,416	„	Feb. 19	8	8	Portsm'th Con. Stk. 4 p.c. Std.	122—127	...	...
241,446	„	„	5	5	Do. 5 p.c. max. ...	78—81	...	...
686,312	„	July 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	83—86*	...	...
389,813	„	June 25	4	4	Do. 4 p.c. Cons. Deb.	84—87	...	...
150,000	10	Apl. 9	6	6	San Paulo 6 p.c. Pref. ...	8—8½	...	...
1,736,968	Stk.	Mar. 19	6½	6½	Sheffield Cons.	105—107e	...	...
95,000	„	July 9	4	4	Do. 4 p.c. Deb.	79—81e	...	...
90,000	10	June 11	‡5	‡5	South African	3⅛—5⅛	...	...
6,709,895	Stk.	July 23	7½	5	South Met. Ord.	101½—103½*	...	102—103
1,136,812	„	„	6	6	Do. 6 p.c. Irred. Pf.	112—115*	...	113½—114½
1,895,445	„	July 9	3	3	Do. 3 p.c. Deb. ...	60—63	−2	62
734,000	„	Mar. 5	6½	6½	Do. 6½ p.c. Red. Db.	98—100	...	...
1,000,000	„	July 23	4	5	Do. 5 p.c. Red. Deb.	100—103*	...	102—103½
91,500	„	Mar. 5	8½	8½	South Shields Con.	113—115d	...	...
1,543,795	„	Feb. 19	6½	6½	South Suburban Ord. 5 p.c.	103—106	..	104
668,837	„	June 25	5	5	Do. 5 p.c. Deb.	100—103	...	...
647,740	„	Feb. 19	5	5	Southampt'n Ord. 5 p.c. max.	78—81	...	...
121,275	„	June 25	4	4	Do. 4 p.c. Deb.	77—80	...	...
179,014	„	Mar. 5	8	8	Sutton Ord.	120—130	...	...
94,500	„	June 25	5	5	Do. 5 p.c. Deb.	96—99	...	...
250,000	„	Mar. 5	7	7	Swansea 7 p.c. Red. Pref. ...	98—101	...	...
200,000	„	June 25	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	...	...
1,076,490	„	Mar. 5	6⅝	6⅝	Tottenham District Ord. ...	103—107	...	105½—107
150,000	„	„	5½	5½	Do. 5½ p.c. Pref. ...	101—104	...	...
199,005	„	June 11	4	4	Do. 4 p.c. Deb. ...	78—81	...	...
85,701	„	Mar. 19	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	74—79	...	...
310,694	„	Mar. 5	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	102—107	...	...
88,330	„	„	5	5	Do. 5 p.c. Pref. ...	90—95	...	...
1,322,220	„	July 9	7	7	Wandsworth, Wimbledon, and Epsom Cons. ...	111—114	...	112½—113½
426,000	„	„	5	5	Do. 5 p.c. Pref.	97—100	...	...
1,013,464	„	June 25	5	5	Do. 5 p.c. Deb.	100—103	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Div. = 10 p.et. p.a. less tax and less tax on interim dividend.

(This announcement is inserted gratuitously.)

PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated, and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea!

THE CHAIRMAN,
SCHOOL FOR THE BLIND
(Founded 1838),
Swiss Cottage, LONDON, N.W.3

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N. L. FLEMING,
Town Clerk.

Town Hall,
Bradford,
July 31, 1931.

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(GAS DEPARTMENT.)

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Ergineer and Manager.

Sidmouth,
August, 1931.

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By order of the Board,
GEO. J. BRISTOW,
Secretary.

Aug. 7, 1931.

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THE Owner of British Patent No. 274436, relating to "Gas Meters of the Differential Pressure Type," is desirous of entering into negotiations for the grant of Licenses, or otherwise, under suitable Terms, for the purpose of Exploiting the Invention and ensuring its Full Development and Practical Working in this Country.
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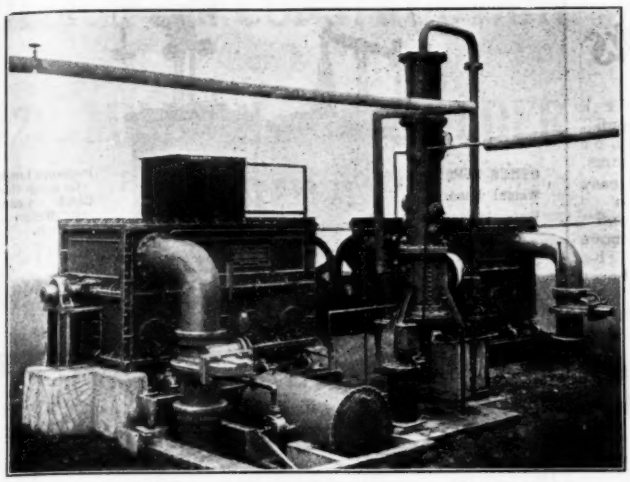

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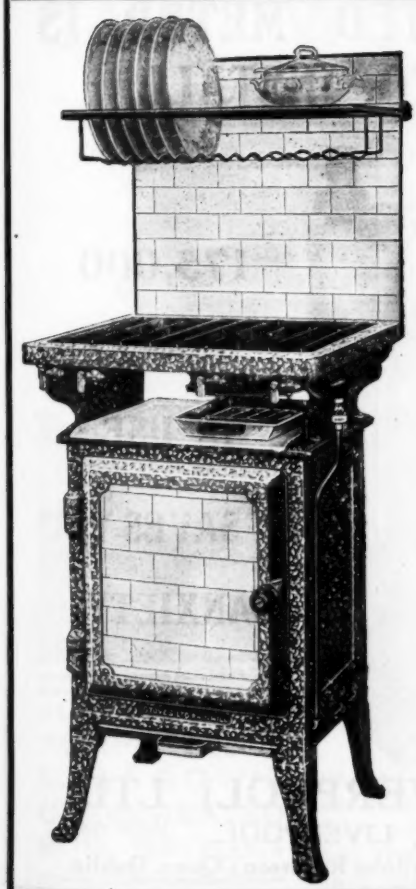

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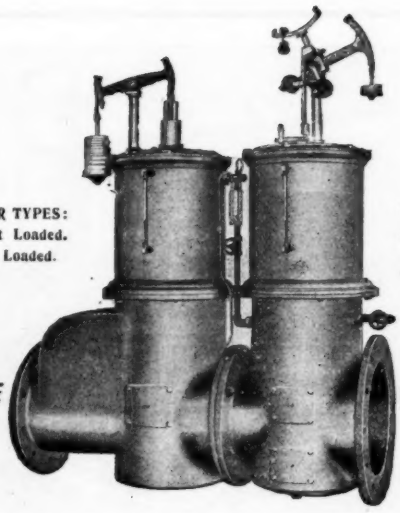

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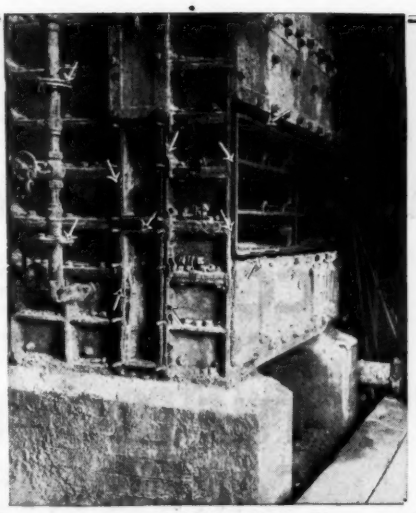

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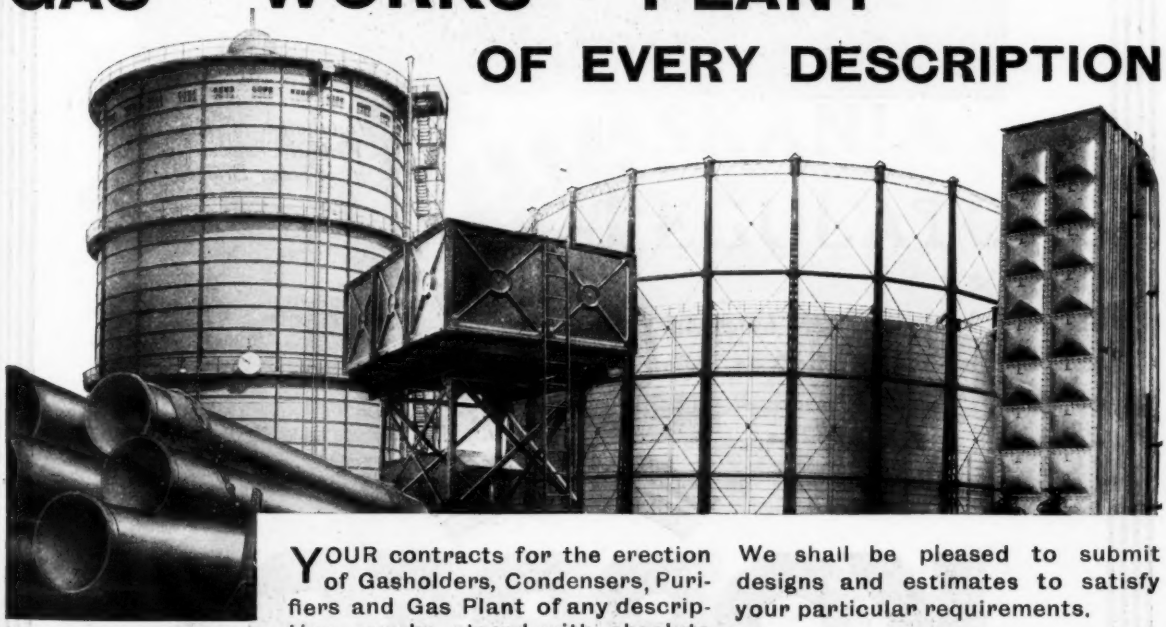

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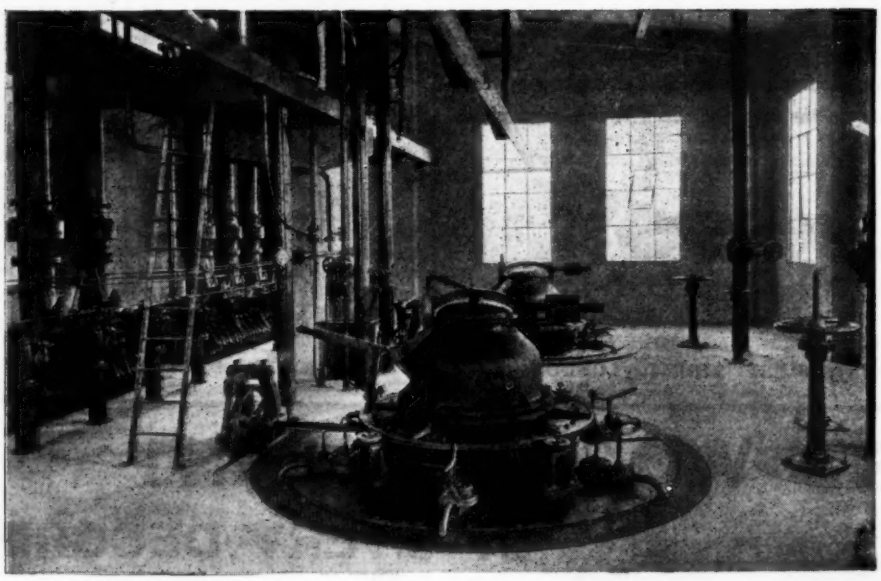

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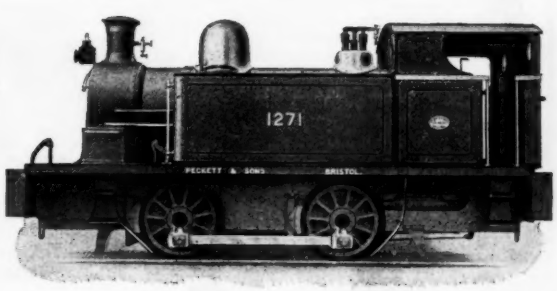

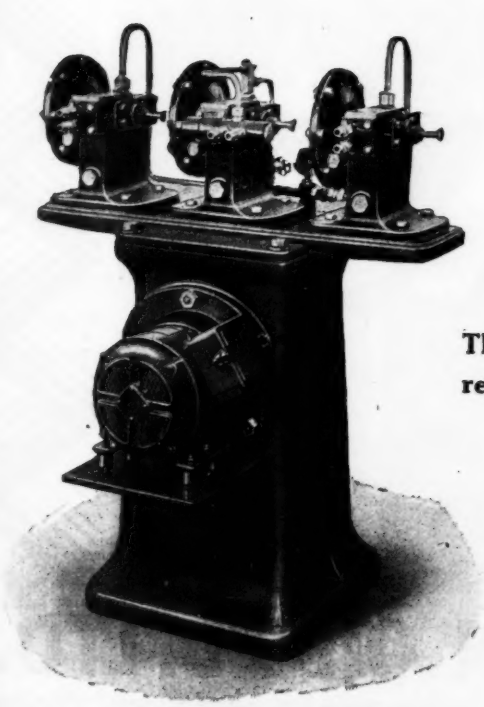

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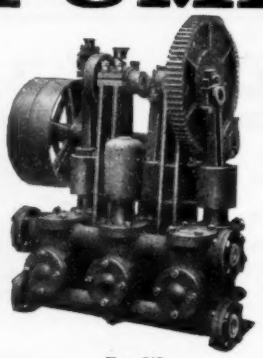

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FIG. 106 FIG. 256 FIG. 257 FIG. 842 FIG. 187 FIG. 69 FIG. 324

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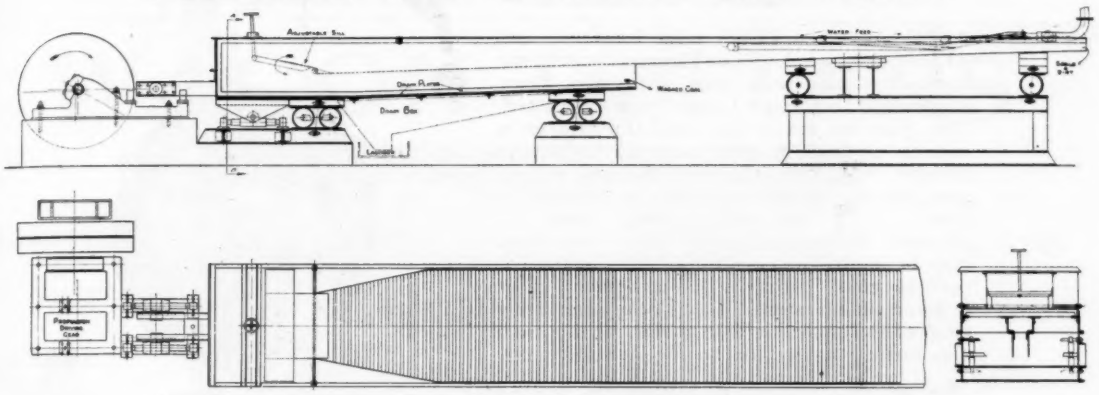

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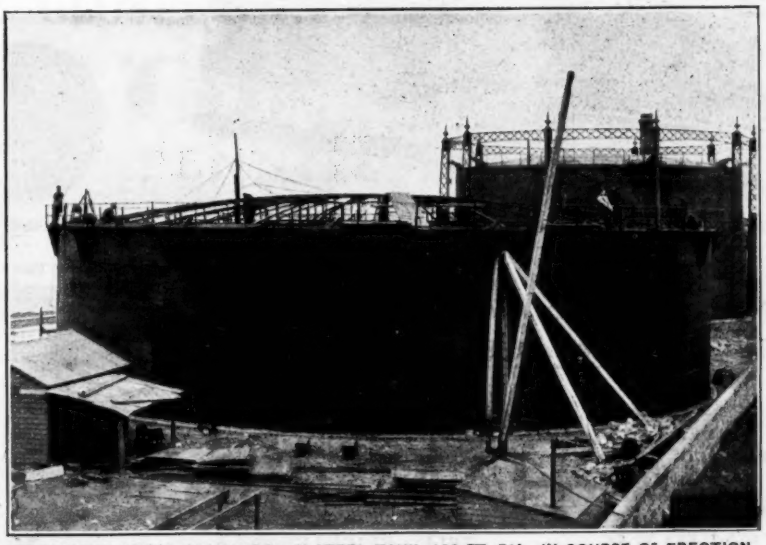

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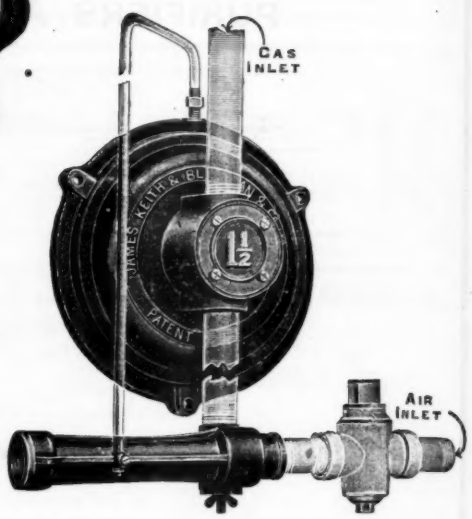

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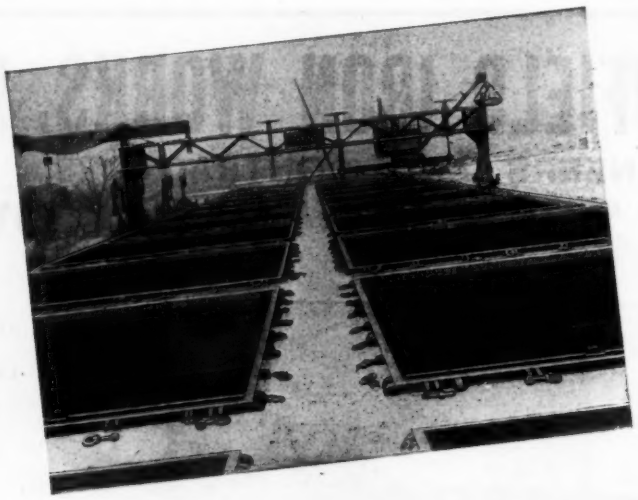

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